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REPORT
of
The North Carolina
Department of Agriculture

For the Biennium 1936-1938



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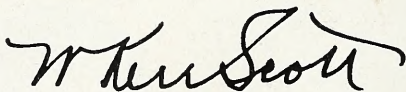
LETTER OF TRANSMITTAL

To His Excellency, CLYDE R. HOEY,
Governor of North Carolina:

SIR:

In compliance with Chapter 248, Public Laws of 1929, I submit the following report of the work of the Department of Agriculture for the biennium 1936-1938.

Respectfully,

A handwritten signature in black ink, appearing to read "W. K. Smith". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Commissioner of Agriculture.

RALEIGH, N. C.,
NOVEMBER 1, 1938.

REPORT
OF
The North Carolina
Department of Agriculture
For the Biennium 1936-1938

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PERSONNEL OF THE STATE DEPARTMENT OF AGRICULTURE

W. KERR SCOTT, *Commissioner, Chairman, Raleigh*

MRS. L. L. STEVENS.....	Shawboro
C. S. YOUNG.....	Shelby
D. R. NOLAND.....	Clyde
T. G. CURRIN.....	Oxford
J. H. POOLE.....	West End
M. L. ADERHOLDT.....	Lexington
CHAS. F. CATES.....	Mebane
W. G. HARGETT.....	Richlands
LIONEL WEIL.....	Goldsboro
W. I. BISSETTE.....	Grifton

ADMINISTRATION

W. KERR SCOTT.....	<i>Commissioner</i>
D. S. COLTRANE.....	<i>Assistant to the Commissioner</i>
MYRTHA FLEMING.....	<i>Stenographer Secretary</i>
MARY KNIGHT.....	<i>Purchasing Agent</i>
A. R. POWLEDGE.....	<i>Senior Auditor</i>
DONNIE M. NORMAN.....	<i>Senior Accounting Clerk</i>
C. P. DEYTON.....	<i>Senior Accounting Clerk</i>
LOUIS H. WILSON.....	<i>Editor of Publications</i>
JERRIE WHELESS.....	<i>Senior Stenographer Clerk</i>
CHAS. HIGGS.....	<i>Janitor Clerk</i>
WORTH JEFFREYS.....	<i>Janitor Messenger</i>
ROBERT HARRIS.....	<i>Janitor</i>

INSPECTION

MARTIN MCCALL.....	<i>Inspector</i>
CHAS. H. GODWIN, JR.....	<i>Inspector</i>
E. J. HARRINGTON.....	<i>Fertilizer Inspector</i>
C. GRANT.....	<i>Fertilizer Inspector</i>
HARVEY MCPHAIL.....	<i>Fertilizer Inspector</i>
J. D. JOHNSON.....	<i>Fertilizer Inspector</i>
JOHN F. REINHARDT.....	<i>Fertilizer Inspector</i>
J. W. TURNER.....	<i>Fertilizer Inspector</i>
J. E. GREENE, JR.....	<i>Fertilizer Inspector</i>
MARION CLARK.....	<i>Fertilizer Inspector</i>

MARKETS

R. B. ETHERIDGE.....	<i>Chief</i>
C. W. SHEFFIELD.....	<i>Senior Marketing Specialist</i>
H. T. WESTCOTT.....	<i>Associate Specialist</i>
MABEL HAYNES.....	<i>Senior Stenographer Clerk</i>
W. P. HEDRICK.....	<i>Senior Marketing Specialist</i>
A. B. HARLESS.....	<i>Senior Marketing Specialist</i>
PAUL L. FLETCHER.....	<i>Senior Marketing Specialist</i>
MRS. FRANCES HARRISON.....	<i>Telegraph Operator</i>
MRS. SABRA BAILEY.....	<i>Senior Stenographer Clerk</i>

BIENNIAL REPORT

CREDIT UNION

C. C. BOOKER.....	<i>Superintendent Credit Union</i>
D. R. GRAHAM.....	<i>Junior Auditor</i>
MARY McMILLAN.....	<i>Stenographer</i>

ENTOMOLOGY

C. H. BRANNON.....	<i>Senior Entomologist</i>
J. A. HARRIS.....	<i>Associate Entomologist</i>
C. S. BRIMLEY.....	<i>Junior Entomologist</i>
D. L. WRAY.....	<i>Junior Entomologist</i>
P. G. CRADDOCK.....	<i>Apiary Inspector</i>
CARY HANSELL.....	<i>Bean Beetle Inspector</i>
PAULINE P. NEWSOM.....	<i>Senior Stenographer Clerk</i>

SEED LABORATORY

J. W. WOODSIDE.....	<i>Senior Botanist</i>
S. D. ALLEN.....	<i>Senior Seed Analyst</i>
ELIZABETH EBY.....	<i>Senior Seed Analyst</i>
MILDRED HENRY.....	<i>Senior Seed Analyst</i>
ELSIE W. EARP.....	<i>Junior Seed Analyst</i>
MAGDALENE BRUMMITT.....	<i>Junior Stenographer Clerk</i>
JOSHUA JAMES.....	<i>Feed Inspector</i>
C. H. LUTTERLOH.....	<i>Feed Inspector</i>
T. A. HOLCOMBE.....	<i>Feed Inspector</i>
VELVA HUDSON.....	<i>Junior General Clerk</i>

ANALYTICAL

B. W. KILGORE.....	<i>Senior Chemist</i>
L. B. RHODES.....	<i>Associate Chemist</i>
W. A. QUEEN.....	<i>Associate Chemist</i>
E. W. CONSTABLE.....	<i>Associate Chemist</i>
PEARL KOONTZ.....	<i>Senior Stenographer Clerk</i>
SARAH G. ALLEN.....	<i>Principal General Clerk</i>
W. C. HAMMOND, JR.....	<i>Food Inspector</i>
W. E. MCNEILL.....	<i>Food Inspector</i>
GORDON POWELL.....	<i>Laboratory Helper</i>
L. M. NIXON.....	<i>Associate Chemist</i>
Z. B. BRADFORD.....	<i>Associate Chemist</i>
E. T. HORD.....	<i>Associate Chemist</i>
H. F. PICKERING.....	<i>Junior Chemist</i>
J. S. PITTARD.....	<i>Junior Chemist</i>
W. P. MATTHEWS.....	<i>Junior Chemist</i>
M. S. BIRDSONG.....	<i>Secretary</i>
HEBER B. HATCH.....	<i>Senior Stenographer Clerk</i>
MOSE LORD.....	<i>Laboratory Helper</i>
ELVIN ROGERS.....	<i>Laboratory Helper</i>
H. D. MATHESON.....	<i>Junior Chemist</i>
FRANK H. BROWN.....	<i>Junior Chemist</i>
LEWIS TERRY.....	<i>Junior Chemist</i>
J. O. DUNSTON.....	<i>Junior Chemist</i>
L. W. PURDY.....	<i>Junior Chemist</i>
CARL W. KELLY.....	<i>Junior Chemist</i>
L. V. AMBURGY.....	<i>Microscopist</i>
ROBERT L. HARRIS.....	<i>Laboratory Helper</i>
DAVID EDWARD BUFFALOE.....	<i>Assistant Chemist</i>

CROP STATISTICS

W. H. RHODES.....	<i>Senior Statistician</i>
S. M. HINES.....	<i>Junior Statistician</i>
T. L. STUART.....	<i>Junior Statistical Clerk</i>
W. T. GARRISS.....	<i>Junior Statistical Clerk</i>
SARAH DRAKE.....	<i>Senior Statistical Clerk</i>

E. R. SIMPSON.....	Senior Statistical Clerk
BESSIE KELLOGG.....	Junior Statistical Clerk
EVA MAY LASSITER.....	Junior Statistical Clerk
MARGARET TAYLOR.....	Junior Statistical Clerk
HERBERT BARNES.....	Senior Mail Clerk

MUSEUM

H. T. DAVIS.....	Senior Curator
H. H. BRIMLEY.....	Senior Curator
ROXIE COLLIE.....	Preparator and Taxidermist
SOPHIA GREEN.....	Junior Stenographer Clerk

VETERINARY

WILLIAM MOORE.....	Veterinarian
L. J. FAULHABER.....	Associate Veterinarian
H. S. WILFONG.....	Junior Bacteriologist
GRACE JOHN.....	Junior Stenographer Clerk
EDNA LEE.....	Laboratory Aid
JOHN J. FILICKY.....	Junior Bacteriologist
FRANK HOWARD.....	Laboratory Helper
W. R. BAYNES.....	Associate Veterinarian
C. E. COX.....	Associate Veterinarian
L. J. FOURIE.....	Laboratory Aid

TEST FARMS

F. E. MILLER.....	Director
KATHLEEN HARRISON.....	Senior Stenographer Clerk
J. L. REA, JR.....	Assistant Director in Charge, Blackland Station, Wenona
F. B. HARRIS.....	Herdsmen
A. P. LEFEVER.....	Foreman
LULA HOLTON.....	Stenographer, Clerk
CHAS. T. DEARING.....	Assistant Director in Charge, Coastal Plain Station, Willard
C. O. BOLLINGER.....	Poultryman
D. P. SOUTHERLAND.....	Foreman
BENNIE L. WILLIAMS.....	Stenographer, Clerk
FRED STEVENS.....	Assistant in Dairying
G. A. MECKSTROTH.....	Associate Pathologist, U. S. D. A.
S. C. CLAPP.....	Assistant Director in Charge, Mountain Station, Swannanoa
HAZEL DRAKE.....	Stenographer, Clerk
R. L. YORY.....	Assistant in Dairying
W. W. ROSS.....	Assistant in Horticulture
W. M. WHISENHUNT.....	Foreman
H. B. COULTER.....	Dairyman
H. D. SMITH.....	Poultryman
J. W. HENDRICKS.....	Assistant Director in Charge, Piedmont Station, Statesville
ROSE BRADFORD.....	Stenographer, Clerk
GRADY BERRY.....	Foreman
R. E. STITT.....	Assistant Agronomist, U. S. D. A.
E. G. MOSS.....	Assistant Director in Charge, Tobacco Station, Oxford
ELIZABETH FLOYD.....	Stenographer, Clerk
JAMES F. BULLOCK.....	Assistant Tobacco Investigations, U. S. D. A.
K. J. SHAW.....	Assistant Tobacco Investigations, U. S. D. A.
T. E. SMITH.....	Assistant Tobacco Investigations, U. S. D. A.
A. B. DEANS.....	Foreman, U. S. D. A.
JOE L. RAND.....	Foreman, McCullers Tobacco Station, U. S. D. A.
R. E. CURRIN, JR.,	Assistant Director in Charge, Upper Coastal Plain Station,
Rocky Mount.	
W. C. ALLSBROOK.....	Foreman
MARY W. CURRIN.....	Stenographer, Clerk
J. P. YOUNG.....	Assistant Tobacco Investigations, U. S. D. A.

BIENNIAL REPORT

DAIRY

C. W. PEGRAM.....	<i>Dairy Specialist</i>
W. E. FULLER.....	<i>Junior Dairy Specialist</i>

STATE WAREHOUSE SYSTEM

A. B. FAIRLEY.....	<i>Superintendent</i>
C. R. REYNOLDS.....	<i>Chief Cotton Classifier</i>
J. B. HAYWOOD.....	<i>Cotton Classifier</i>
ROBERT S. POUL.....	<i>Warehouse Examiner</i>
MRS. J. N. MASON.....	<i>Senior Stenographer Clerk</i>
MRS. HALLIE K. MORROW.....	<i>Senior Stenographer Clerk</i>
ELIZABETH FLEMING.....	<i>Junior General Clerk</i>
E. L. UPCHURCH.....	<i>Senior General Clerk</i>
FRED JOHNSON.....	<i>Gin Expert</i>

WEIGHTS AND MEASURES

C. D. BAUCOM.....	<i>Superintendent</i>
H. W. HOOD.....	<i>Inspector</i>
GEORGE S. TURNER.....	<i>Inspector</i>
JOHN ARCHIBALD COOK.....	<i>Inspector</i>

N. C. STATE FAIR

J. S. DORTON.....	<i>Manager</i>
EDNA DEES.....	<i>Senior Stenographer Clerk</i>
G. C. ELLIS.....	<i>Caretaker</i>

BIENNIAL REPORT OF THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE

By W. KERR SCOTT, *Commissioner of Agriculture.*

North Carolina's Department of Agriculture has been revitalized during the biennium.

Work of divisions has been consolidated to eliminate overlapping activities and to effect economy. Equipment has been added to increase efficiency. Changes in personnel and the addition of needed specialists have made it possible to give greater inspectional, regulatory and service work. Changes in the laws affecting the welfare of the farmer have been made with the deliberation and coöperation of all agencies involved.

Facts point to the progress made by the Department already, but demands for services are increasing and the Commissioner of Agriculture and his personnel are aware that there are other agricultural challenges to be met in the broad program to help the farmer increase his income.

The Commissioner of Agriculture is not unmindful that he is the trustee of funds provided by the farmer for the operation of the Department of Agriculture. Each change of policy and law, each revision of activity, each addition to the personnel and equipment has been made as an investment to yield dividends of service and provide "the greatest good to the greatest number."

Strict enforcement of the regulatory and inspectional laws has brought definite savings and protection to the farmer who buys fertilizers, feeds and seeds and equal protection has been given the honest manufacturer.

A report of the Department is a report of its divisions. Letting "the record speak for itself," a condensation of division activities follows:

Markets: A federal-state market news service has been added, providing growers with last-minute information on agricultural price trends and conditions to enable them to more intelligently market their commodities. A tobacco marketing specialist, first employed in the Department's History, is now promoting proper grading, sorting and tying practices as a means of increasing the farmer's income. A livestock marketing special-

ist has been employed in an effort to assist livestock men in climbing above 38th place in farm cash income from livestock. Egg grading and certification work was inaugurated last year.

Chemistry: Compared with the past biennium, there has been a 37.3 per cent increase in fertilizers analyzed, 151 per cent in feeds analyzed, 24.6 per cent in foods or an average of 35.3 per cent increase in work on fertilizers, feeds, foods and all other materials of a general agricultural nature. Two laboratories have been added to give growers information as to whether their fertilizer is acid forming or non-acid forming and the degree to which it is guaranteed and also to determine the magnesium content of fertilizer. The Pure Food Division and Fertilizer Analytical Division were combined in the interest of efficiency and economy. Sanitary conditions, under which ice cream is made, have been improved.

Test Farms: Appropriations and federal grants for the six Test Farms have been the largest in the history of the farms, permitting an enlarged experimental program in answer to the increasing demand for new information on farm production problems. A total of 143 experimental projects dealing with horticultural and field crops, livestock and poultry are under way. A total of 407 acres of new land has been bought for experimental work and nine additional acres leased for peanut disease control studies. All roads to the farms have been paved or are scheduled to be paved. An \$80,000 federal appropriation for laboratory buildings and an office at the Tobacco Test Farm (Oxford), \$39,000 from the WPA to build modern dairy barns and secure equipment for the Coastal Plain Test Farm (Willard) and an annual appropriation of \$7,500 from the Bureau of Dairy Industry for dairy research at Willard have been secured.

Veterinary: Addition of five veterinarians to the Department's staff has made it possible to launch a swine disease control program with definite progress already reported. Hog cholera control and eradication is an immediate goal of the division. Protection of the poultry industry has been increased with the addition of five inspectors who have doubled the number of birds tested for the dreaded Pullorum disease. Tests for Bang's disease, a costly disease of cattle, have been completed in six counties; tests are underway in 16 counties and 15 counties are on the waiting list. The number of cattle tested has been tripled. A 25 per cent increase in investigations of contagious livestock disease outbreaks has been achieved.

Dairy: A system of "test supervision" has been set up to protect dairymen from inaccurate or careless testing, weighing and sampling of milk and cream sold by them. Definite check-

test investigations are made rather than test observations as were made in the past. A total of 21,000 tests have been made compared with 7,903 during 1934-36.

Warehouse: A gin inspector has been added to the staff to give ginner mechanical aid and service work with resultant benefits to the growers. A heavy-duty scales testing unit has been purchased and is now being used in a state-wide gin scales testing program. Federal funds have been obtained for the erection of a modern classing and grading building costing \$42,000, enabling the Department to render more prompt and efficient grading and stapling service.

Credit Unions: With \$4,500 obtained from the general fund to match an equal amount from the Department for organization and auditing of rural and urban Credit Unions, results are indicated during the past fiscal year by the fact that members have increased 44.6 per cent; assets, 25.6 per cent; number of loans 45.2 per cent; reserve, 31 per cent and surplus, 27 per cent.

Entomology: A state apiary inspector has been employed for the first time and is now waging a productive campaign to protect the state's \$1,500,000 honey industry from destruction by the costly foulbrood disease. An appropriation of \$5,000 has been made to partially match federal funds for the protection of the white pine trees against white pine blister rust. Publication of a book by Dr. C. S. Brimley on "Insects of North Carolina" is a distinct contribution in the field of natural science in the nation.

Statistics: More than 180 original reports on practically all phases of agriculture have been compiled by the state-federal crop reporting service. With a slight increase in personnel, increased efficiency has given the division national recognition with relation to presentation of county farm facts, reports, reliability of information developed and scope of service.

Accounts: Handling of all accounts, purchases and inventories, heretofore scattered throughout the divisions, has been centralized in the Division of Accounts, created in the interest of efficiency and economy. A modernized accounting system, improved methods of handling the sale of fertilizer, feed, and seed and other tax tags have made it possible to render quicker service at a minimum overhead.

Weights and Measures: Purchase of new equipment and addition to the inspection staff have been made possible with an increase of funds appropriated by the General Assembly. It is now possible for the Department to test weights and scales from one-tenth of a grain to ten tons. From January, 1937 to July

1938, a total of 124,440 inspections have been made and 8,098 places of business have been visited.

Seed Laboratory: Once known as the "dumping ground" for poor quality seed, North Carolina has joined the more progressive states with the perfection of a seed testing laboratory second to none in the South. Seed tests for germination and purity were increased 65 per cent over the previous biennium. A total of 20,714 seed tests were made free of charge for farmers. With the addition of one analyst, the capacity for work has been approximately doubled.

State Fair: The Great State Fair, operated under private lease for many years, was taken over by the Department in 1937, and operated at a profit for the first time under State management. Agriculture, industry and education were paramounted in exhibits and the fact that the number of individual exhibitors was doubled attests the people's approval of an exposition presented as a state institution. While reports on the 1938 Fair have not been completed, it is definitely known that this exposition was an educational and financial success.

State Museum: Addition of new exhibits, improvement of old exhibits with an increase in appropriations have made it possible to make the museum more attractive and serviceable to the 200,000 or more annual visitors. The first printed pamphlet on the activities of the museum was published in 1938.

Publications: A weekly news service of six or seven stories, covering virtually all phases of the Department's work, has been furnished for the first time and generally used by the newspapers and agricultural publications. THE AGRICULTURAL REVIEW, semi-monthly news organ of the Department, has been materially improved and furnishes 18,000 farm families up-to-date, accurate information on the Department's services, program and general agricultural material. An appreciation of the enlarged activities of the divisions has been indicated by newspapermen who have requested and received an increasingly large number of special stories.

Upon recommendation of the Commissioner, the Board of Agriculture was increased from five to ten members so that its members would more nearly represent every section and phase of agriculture in the state. Authority in matters of policy, also upon request of the Commissioner of Agriculture, was transferred from the Commissioner to the Board in the interest of democracy.

AGRICULTURAL LAWS:

Changes and Enforcement

By D. S. COLTRANE,

Assistant to the Commissioner.

Changes in the Fertilizer, Feed and Seed laws of North Carolina have been made during the biennium with the view of giving the farmers, manufacturers and dealers greater protection.

Realizing the inter-dependent relationship between the farmer, manufacturer and dealer, representatives of all commercial and non-commercial agricultural agencies affected under laws enforced by the Department of Agriculture have gathered at the conference table and contributed their thought and co-operation to the end that the present statute changes have yielded inestimable service to the state.

The Department will continue its policy of inviting farmers, manufacturers, research leaders, farm agencies and others to give their views and co-operation when the need for changes in laws is presented. It is realized that the maximum enforcement of agricultural laws or any other laws cannot be realized without the support of all parties concerned.

As an inspection, regulatory and service agency, the Department realizes that no part of its work is more important than the strict enforcement of the Feed, Fertilizer and Seed laws, especially since our farmers annually purchase approximately \$25,000,000 worth of fertilizer, about \$10,000,000 worth of feed and around \$5,000,000 worth of seed.

INFORMAL FERTILIZER CONFERENCE

Realizing that the fertilizer law did not include all the desired guarantees and sufficient penalties for failure to meet some of the existing guarantees, an informal conference was held in February, 1937. Representative farmers, manufacturers, farm organizations and research authorities drafted amendments that were acceptable to the General Assembly.

Amendments provided: (1) Guarantee as to whether the fertilizer is acid or non-acid forming; (2) For the guarantee of minimum per cent magnesium oxide; (3) Optional guarantee as to the minimum per cent of calcium oxide and (4) Optional guarantee as to the maximum sulphur in tobacco fertilizer.

Under amendments, penalties were provided for failure of manufacturers to meet the additional guarantees allowed and for failure to meet other provisions of the law such as the nitrate and water insoluble nitrogen guarantees.

FEED CONFERENCE

Discovery that many feeds sold in North Carolina contained rice hulls, an ingredient prohibited in feeds under the law and regarded as injurious to livestock, a general conference was called by the Department in July, 1937. An investigation revealed that some mills had hundreds of bags of rice hulls.

Meeting with Department officials, the North Carolina Feed Manufacturers, in informal conference, passed a resolution pledging co-operation in eliminating rice hulls as a feed ingredient and further pledging to remove all feeds containing rice hulls that were in the hands of dealers. Strict inspection of the feed tags was of material aid in keeping feeds containing rice hulls off the market.

SECOND FEED CONFERENCE

Since the State Feed Law had been regarded as nothing more or less than a "correct labeling act," the State Board of Agriculture exercised its authority to make rules and regulations and adopt feed standards for various special purpose feeds and generally provide for regulations commensurate with progressive agricultural legislation.

Feed manufacturers, farm organization representatives from the Farm Bureau, Grange, Farmers Federation and others, the State Dairymen's Association, the State Poultry Association with feed experts from the Department and State College participated in the second informal conference in October, 1937. A committee was appointed by the group to draft feed rules, regulations and standards for approval of the Board of Agriculture and the board approved the changes January 5, 1938 to become effective April 1, 1938.

SPECIAL PURPOSE FEEDS

Prior to April 1, 1938 the only standard for feed stipulated that the minimum protein should be nine per cent. Changes in regulations now place the minimum protein for dairy feeds at 15 per cent, minimum fat at three per cent and maximum fiber at 15 per cent; in hog feeds, minimum protein at 14 per cent, minimum fat at three per cent and maximum fiber at eight per cent; in most poultry feeds, minimum protein at 15 per cent,

minimum fat at four per cent and maximum fiber at seven per cent.

Registration of all feeds that did not meet the new standards was cancelled April 1, 1938.

LOW GRADE MATERIALS

A new standard for maximum fiber content for feeds was set to exclude excess fillers and assure a high percentage of nitrogen free extract. New regulations prohibit the use of peanut shells, peanut hulls, oat hulls, clipped oat by-products, rice hulls, rice chaff, rice straw, barley hulls, coffee hulls, chaff, sawdust, sand, dirt, ground soy-bean stems, ground corn cobs, corn stalks, coconut shells, wheat straw, or any other substance injurious to the health of animals or having little or no feeding value.

An experienced microscopist was employed to determine (1) whether the feed contained the guaranteed ingredients and the quality of each; (2) whether the feed contained other ingredients and whether or not they were adulterants; (3) whether any of the ingredients were present in quantities too small to affect the nature of the feed.

SEED LAW AMENDED

Governor Clyde R. Hoey and Commissioner of Agriculture W. Kerr Scott promised the farmers they would take steps to stop the sale of poor quality seeds in the state, should they be elected to office. A study of the Seed Law revealed it did not provide adequate protection to the farmer; amendments were drafted, presented to the General Assembly and unanimously approved. Before the amendments were presented to the Legislature, they were approved by the N. C. Crop Improvement Association and the N. C. Seed Dealers Association.

RETAIL SEED DEALERS LICENSE REDUCED

The wholesale and retail seed dealer's license had been \$25 since 1918, but records revealed that only a small per cent of all dealers actually paid a license fee. Believing that if one dealer paid the license in conformity with the law, all should pay, the Department began strict enforcement of the seed statute.

Believing the retail license of \$25 was too high, one amendment lowered the tax to \$10. Revenue obtained from the sale of licenses made it possible to make the Seed Laboratory self-supporting, made it possible to give adequate inspection service and permitted the purchase of equipment to give the state one of the best seed laboratories in the nation.

FERTILIZER

Adequate fertilizer inspection service has been provided North Carolina farmers who have continued to lead the Nation for 19 consecutive years in fertilizer purchases.

One sample of fertilizer was taken for approximately each 200 tons sold. An effort was made to secure a reasonable number of samples from each company. Twelve part-time inspectors were used during the biennium, regularly taking samples and making inspections in all sections of the state.

A total of 10,447 samples of fertilizer were collected and reported during the biennium, representing an aggregate of 108,144 bags officially sampled for analysis.

Improvement in the quality of fertilizer sold in the state is indicated by the fact that the manufacturers were penalized on only 2.4 per cent of the samples drawn. Penalties levied on 317 lots of fertilizer amounted to \$7,995.29.

Of the 4,854 samples reported in 1937, a total of 4,050 were equal to or above the guaranteed value; 688 samples were below guarantee, but within the tolerance allowed under the law. These facts substantiate the value of careful enforcement of regulatory measures and indicate protection given the farmer as well as the honest manufacturer.

The Department invited farmers to request inspectors to take special samples wherever desirable. A total of 395 special farm samples were secured.

FEED INSPECTION SERVICE INCREASED

Feed and Seed inspectors were increased from two to four after the first eight months in the biennium and one chemist added to the feed laboratory under the Department's program to render a greater inspectional and regulatory service. As feed samples were secured, they were analyzed immediately, whereas in the past several weeks elapsed before reports were given. By speeding up the analytical work, the sale of poor quality feed was stopped before it was all sold.

From all sections of the state, inspectors collected 2,196 official feed samples, 483 miscellaneous feed samples and 164 cotton seed meal samples. A reasonable number of samples was sought from each feed company and extra precaution taken to secure samples of brands previously found below guarantee.

Penalties amounting to \$1,326.50 have been assessed and paid to cover feed seizures. Six hundred lots of feed were seized and held for satisfactory adjustment and in most cases the feed was released after penalties were paid and the product re-tagged to

show the correct analysis in conformity with the laboratory report.

A strict enforcement of the feed law has made it possible for a feeder of livestock and poultry to buy a brand of feed with reasonable assurance that it will contain guaranteed ingredients. The farmer can buy with greater economy if he will study the chemical analysis and ingredients of feed as guaranteed on the tag, selecting the feed best suited for his livestock and poultry.

A program designed to reduce the number of grades of fertilizer and increase the plant food content has been initiated by the Department of Agriculture. The movement has been recognized by fertilizer experts of state and national reputation as being agronomically and economically sound.

Under present plans, a reduction of the 202 grades of fertilizer is being sought to relieve the farmer of much confusion when he goes to buy his requirements. Realizing that the average fertilizer purchased in the state contains an average of only 15.2 units of plant food, while the United States' average is 20 units, steps are being taken to promote greater use of high analysis fertilizer. Definite progress has been made.

COMPARATIVE STATEMENT SHOWING ACTIVITIES OF INSPECTORS IN THE INSPECTION OF FERTILIZER, FEED, SEED, LIME, LAND PLASTER AND INSECTICIDES DURING YEARS ENDING JUNE 30, 1937 AND JUNE 30, 1938.

FERTILIZER

	Year Ending June 30, 1937	Year Ending June 30, 1938
Number of Tons sampled.....	28,732	29,918
Number of Tons drawn.....	5,629	4,818
Number of Tons seized.....	126	528
Number of Seizures for violation of law.....	20	82
Number of penalties assessed manufacturers.....	116	146
Aggregate Amount of Penalties Assessed.....	\$3,760.91	\$4,234.38
Number of bags sampled.....	50,883	52,236

FEED

Number of Tons sampled.....	2,286	3,216
Number of samples drawn.....	741	1,443
Number of seizures for violation of law.....	133	467
Number of tons seized.....	304	616
Aggregate amount of penalties assessed.....	\$ 465.00	\$ 861.00

COTTONSEED MEAL

Number of samples of cottonseed meal analyzed.....	98	132
Number of seizures for violation of law.....	10	29

SEED

Number of samples taken.....	147	616
Number of seizures.....	No provision	25

Number of samples of lime and land plaster.....	79
Number of seizures Lime and land plaster (failure to guarantee analysis).....	24
Number of Insecticides samples for the biennium.....	86

PUBLICATIONS DIVISION

LOUIS H. WILSON

A general increase in the regulatory, inspectional and service work of the North Carolina Department of Agriculture has furnished the Publications Division with news that has been readily accepted and printed by the Newspapers and agricultural publications of the State.

Information concerning the Department's program and progress has been furnished virtually every news-gathering agency in the state. A conscientious effort has been made to place quality of news stories above quantity.

Constant requests for special stories by newspapers and other publications attest the interest in the Department's activities and indicate a growth in the demand of the Publications Division services.

Newspapers: A weekly news service of six or seven stories is being furnished all newspapers of the state for the first time.

Press Associations: Current information on all phases of the Department activities is furnished promptly to the Associated Press and the United Press which serve the daily newspapers of the State. The press associations together with the Bureau of the North Carolina Association of Afternoon Dailies, have been furnished advance and current information on agricultural events, addresses and feature articles.

One of the most acceptable services of this division has been the weekly farm page article prepared exclusively for the Associated Press for release in Monday morning newspapers. All news services have been given special stories upon request.

Agricultural Review: Voluntary requests made by farmers and other citizens for the *Review* have resulted in the addition of approximately 5,000 names to the mailing list within the past 12 months, bringing the total circulation to 18,000.

The *Review* is a four-page publication, issued twice a month and sent free to farmers or any other citizen upon request. It is the official organ of the Department and contains news stories of particular interest to the farming population. One section of the publication contains a detailed list of "Low Analysis and Incorrectly Labeled Feeds found in the State," a new service furnished farmers with the view of giving them more information to be used in intelligent buying of feedstuffs.

An increasingly popular feature of the publication is the want-ad section, restricted to the use of farmers and others having articles "for sale" or "exchange." Advertisements are printed

without charge as a marketing service primarily for farmers and the policy of the *Review* does not permit the acceptance of advertisements from commercial concerns.

Bulletins: Improvements have been made in all regular bulletins issued by the Department during the biennium. Appropriate illustrations have been used, special folders have been issued and in all publications greater "reader appeal" has been obtained with the use of pictures. Explanatory articles by the various heads of divisions and by agricultural authorities coöperating with the department have added to the attractiveness of such regular publications as "Analyses of Commercial Fertilizer" and "Analyses of Mixed Feeds."

Pictures: More and more, newspapers are becoming "picture conscious." The Publications Division has furnished many news-photos to the daily press and other publications to be used in illustrating articles on inspectional, regulatory and service work of the Department. Special picture assignments made by newspapers have been promptly completed; and while the picture service of the Department is relatively new, it is of distinct value to the press and adds materially to the attractiveness of most newspaper articles.

Radio: Special broadcasts on outstanding events and news have been given through coöperation and courtesy by Radio Station WPTF in Raleigh. The United Press, which is furnished all current news concerning the Department, releases news articles to the major radio stations—thus "radio coverage" is furnished listeners as frequently as the news-value of the story permits.

Information: Many requests for information on agriculture and other subjects have been handled by the division. In cases where the questions require attention of various agricultural specialists, the requests are forwarded to the most logical organization or authority.

State Fair: Publicity for the Great North Carolina State Fair has been handled by the Publications Division since the Department took over the operation of the exposition in 1937. Newspapers and the radio stations have been generous in accepting articles on the fair, particularly since it has become a state institution with a management paramounting agriculture, industry and education.

The revitalization of the Department of Agriculture, and the aggressiveness and determination of the present Administration to enlarge the regulatory, inspectional and service work of the various divisions have made news in North Carolina and brought sympathetic editorial treatment from the agricultural, daily and weekly newspaper editors.

DIVISION OF ENTOMOLOGY

C. H. BRANNON

This Division submits the following report for the past bien-nium:

DUTIES

The Division of Entomology is engaged in inspections, quarantines and other regulatory and law enforcement work in connection with plant pests, insects affecting man and animals and bee diseases. Keeping up to date its valuable collection and records is also a major activity.

NURSERY INSPECTION

The biggest single project of the Division of Entomology is the annual inspection and certification of all North Carolina nurseries. This tedious work requires the efforts of two of our staff, Mr. J. A. Harris and Dr. D. L. Wray, during July, August and September. Nurseries which are found apparently free from dangerous plant pests are issued a certificate of inspection which expires September 30, of the following year. The North Carolina certificate of nursery inspection is accepted by all states and the Federal Government. 170 nursery certificates were issued in 1936-37. 190 nursery certificates were issued for 1937-38. Certificates are not issued until inspection fees are paid.

The nursery fees are as follows:

Three acres or less	\$ 5.00
Four to ten acres	7.50
Eleven to fifteen acres	10.00
Sixteen acres	12.50
10¢ for each additional acre.	

NATIVE PLANT COLLECTORS PERMIT

An annual fee of \$10.00 is required for a permit to collect and ship wild native plants including boxwood. Approximately 25 such permits are issued each year.

NURSERY DEALER CERTIFICATE

The annual nursery dealer certificate is \$10.00. This applies to individuals or stores. Approximately twenty such certificates are issued annually. This number is expected to increase considerably since recent regulations require individual units of chain organizations to obtain separate certificates. Certified dealers

promise to handle only certified nursery stock and are checked by members of our staff as frequently as funds will permit.

A regulation requiring bond of \$5,000 of all dealers or nurseries who promise later attention to nursery stock sold in North Carolina was made effective May 19, 1937.

A reciprocal regulation was passed by the Board of Agriculture requiring nurseries from states which require out-of-state registration fees to pay the same fee for shipping nursery stock into North Carolina as that charged North Carolina nurserymen for shipping into the respective states requiring such fees. This regulation was effective October 1, 1938.

APIARY INSPECTION

Mr. P. G. Craddock, North Carolina's first full time Apiary Inspector, was added to the staff July 1, 1937. The Apiary Inspector is engaged in the enforcement of North Carolina's bee disease regulations as a protection to the bee keepers of the State. During the year July 1, 1937 to July 1, 1938, approximately 11,252 colonies of bees were inspected in 48 counties. However, the greater part of this work was done in the following counties: Beaufort, Bladen, Columbus, Haywood, Hyde, Martin, Pender, Robeson and Washington. Three and four-tenths per cent of the colonies inspected were found to be infected with American Foulbrood, the dreaded scourge of the bee and honey industry.

Several apiaries were inspected for beekeepers who reside out of the State but who leave their bees in North Carolina permanently. Some of these apiaries were badly infected with disease.

Eleven certificates for queen rearing were granted during the year. Two permits were issued for bees moving out of the State.

One thousand and forty colonies from New York State were inspected.

A summer assistant is greatly needed in this work in order to facilitate eradication of bee diseases. North Carolina is fortunate in having undertaken this work before the entire state has become heavily infected. If extensive work can be expanded at once there is a good chance of effective control before it is too late.

WHITE PINE BLISTER RUST PREVENTION

The following report has been submitted by Mr. H. B. Teague, of the U. S. Bureau of Entomology and Plant Quarantine, who is State Leader in charge of Blister Rust work in North Carolina.

"Since July 1, 1936 the White Pine Blister Rust prevention program has been conducted in the state on private, State and Federal owned lands. The work has been carried out by the

U. S. Department of Agriculture in coöperation with the N. C. Department of Agriculture. Federal supervision has been furnished by Dr. S. B. Fracker, Chief of the Division of the Plant Disease Control; Mr. Roy G. Pierce, Pathologist, supervisor of



ERADICATING *Ribes grossularia* IN EDGE OF FIELD NEAR HOUSE. LOCATED NEAR CRAGGY, N. C., BUNCOMBE COUNTY. (U. S. D. A.)

the Southern Appalachian region; Mr. H. B. Teague, State Leader in charge of North Carolina District supervisors are foremen in the North Carolina Blister Rust Control areas.

Blister rust control work has been done in twenty counties. Of these fourteen have been completed for first working, two have been worked the second time, and six have been partially worked the second time and eight remain yet to be completed. Although the project was a Federal undertaking with most of the funds furnished by the Federal Government until July 1, 1937, the State Department of Agriculture was active in giving supervision to the work. Effective July 1, 1937 the State gave \$5,000 in addition to other services rendered to supplement the funds allotted by the Federal Government. This state fund is administered by C. H. Brannon, State Entomologist.

The object of blister rust control work is to prevent white pines of the state from becoming infected with a fungus disease called white pine blister rust which kills the pines. The life cycle of this disease organism requires for its completion an alternate

host plant, either currant or gooseberry. By destroying these bushes and breaking the blister rust cycle the spread of the disease to healthy white pines can be prevented. During the past two years blister rust work has consisted of contacting land owners in the white pine growing sections, explaining the dangers of this disease, and securing the coöperation of land owners in preventing the infection of their white pines. In most cases the owners agree to destroy their currant and gooseberry bushes or to allow them to be destroyed by the blister rust workers. In a few cases the owners would not consent to have the bushes destroyed. The names of all such owners and their addresses have been recorded for future reference.

There are three general classes of currants and gooseberries found in North Carolina growing near white pine: cultivated, escaped and wild. Seven different species have been found in cultivation. Four species have been found near abandoned house sites and have escaped cultivation. Two species of native wild bushes have been found growing near white pine. These two species of native bushes are the smooth, wild gooseberry, *Ribes rotundifolium*, and the prickly wild gooseberry, *Ribes cynosbati*. Another bush native to the state, but heretofore not found within infection range of white pine, is the skunk currant, *Ribes grandulosum*.

During this biennium, about 60 million board feet of white pine lumber were cut in the state, worth \$1,300,000. There are approximately 800 thousand acres of white pine in the state with a seedling value of about seven and one-half million dollars. This acreage has been on the increase for several years, especially since chestnut blight killed the chestnut trees and gave white pine a chance to seed in where seed trees were present. Also in many sections old fields and pasture land have been retired for reforestation, and white pine is seeding in wherever seed trees are present in such sections. Some planting of white pine has been done in the state and intensive planting programs are being planned by the Forest Service, by the Soil Conservation Service and by the T.V.A. Many other divisions are also materially increasing the white pine acreage in the state. A program of careful fire prevention and control has been an important factor in the increase of white pine in the state.

A member of the Forest Service has stated that the Southern Appalachian region has the possibility of becoming one of the leading white pine producing sections in the country. He pointed out the advantage of soil and climatic conditions, the rapid growth and small damage caused by insects as being in favor of white pine production. He also pointed out the high value of first grade

white pine lumber, and the low cost of producing white pine free from blister rust. Good forestry practice increases the value of white pine lumber, and the blister rust organization heartily endorses such forestry practices. In one instance a land owner paid \$1.50 per thousand board feet in pruning his white pine trees when they were small, and he received from \$40.00 to \$60.00 per thousand instead of about \$20.00 per thousand board feet which was being paid for knotty, low grade lumber. We are not only interested in the production of white pine free from blister rust, but are also interested in the land owner getting the highest possible prices for his trees when cut.

Our organization has worked twenty white pine growing nurseries in the state, including the Soil Conservation Service nursery at Chapel Hill, and the State Forest Service Nursery near Hendersonville.

Work has been completed on two divisions of Pisgah National Forest and is being carried forward on the two other divisions. Initial work has been completed in the Nantahala National Forest in Jackson and Macon counties, and 14,000 acres have been worked in the Great Smoky Mountains National Park. The following table summarizes blister rust control activities in North Carolina for the two years period, ending June 30, 1938:

SURVEY	
Number acres of pine	527,331
Number acres control	1,593,903
Number man days used	18,474

ERADICATION	
Number acres pine	527,331
Number acres worked	1,314,375
Number cultivated	269,440
Number wild	434,743
Total	704,183
Number man days	16,608
Costs Federal	*\$85,182.99
Costs State	*\$16,884.50

*Add 1938 costs.

JAPANESE BEETLE

QUARANTINE

The Japanese Beetle Quarantine as included in the last biennial report was amended to include the township of Charlotte, effective for the shipping season of 1938. Mr. C. J. Hansel of our staff is located at Greensboro for the purpose of enforcing the Japanese Beetle Quarantine in coöperation with Mr. H. B. Ward of the Richmond office of the U. S. Bureau of Entomology and Plant Quarantine. No nursery, ornamental, or greenhouse stock, or other plants, plant roots, sand, soil, earth, peat, compost, or

manure can be transported in any manner from the quarantined area without a special Japanese Beetle permit. Rigid inspections of greenhouses and nurseries are made by State and Federal inspectors.



JAPANESE BEETLES COVERING A PEACH. (U. S. D. A.)

In addition to Charlotte township the other areas within the quarantined zone are in the vicinity of Winston-Salem, Greensboro and Salisbury.

TRAPPING

Trapping for the Japanese Beetle is a method of determining the spread of the beetle, and is not intended to reduce the infestation. The traps contain a bait which attracts the beetle from as far as half a mile. In coöperation with the U. S. Bureau of Entomology and Plant Quarantine these traps have been placed over the State during the flight periods of the Japanese Beetle. In order to match much larger Federal funds the State of North Carolina, at the request of the Federal Government, allocated \$2200 for this work in 1937 and \$1338 in 1938 to be administered by this Division.

During June and July, 1937, 6,600 traps were placed in 13 cities. A total of 1,110 beetles were caught. All but two of the cities trapped yielded beetles as follows: Asheville 0, Burlington 0, Charlotte 13, Durham 6, East Spencer 194, Elizabeth City 1,

Greensboro 370, High Point 3, Raleigh 4, Rocky Mount 3, Salisbury 6, Spencer 227, Wilmington 9, Wilson 1, Winston-Salem 273.

During June and July 1938, 5,830 traps were placed in 23 cities. A total of 152 beetles were caught as follows: Asheville 0, Chadbourn 0, Concord 0, Durham 15, Elizabeth City 11, Fayetteville 0, Gastonia 0, Greenville 0, Hamlet 5, Henderson 0, High Point 34, Kinston 1, Lexington 2, New Bern 0, Raleigh 20, Reidsville 0, Rocky Mount 1, Sanford 16, Statesville 1, Thomasville 2, Washington 0, Wilmington 40, Wilson 4.

The relatively small number of beetles caught in 1938 was due, for the most part, to traps not being placed in the heavily infested areas now under quarantine.

ORIENTAL PEACH MOTH PARASITE WORK

In coöperation with the U. S. Bureau of Entomology and Plant Quarantine peach twigs infested with larvae of the Oriental Peach Moth were collected by Mr. J. A. Harris from various points in the peach sections and sent to the Federal laboratory at Moorestown, New Jersey for parasite emergence records. 642 infested twigs were collected in May, 1937. 396 peach moth larvae emerged from these twigs but only one parasite (*Macrocentrus instabilis*) appeared from the material. Due to conditions which are not at present understood, the large number of parasites previously released in the State have not been able to establish themselves.

During May 1938, Dr. D. L. Wray collected 859 infested peach twigs which were forwarded to the Federal laboratory. The emergence records from this material are not yet available.

NARCISSUS BULB INSPECTION

Careful and tedious inspections are required to protect the commercial bulb growers from nematode and bulb fly infestations, which would seriously affect the entire industry if regular inspections were not made.

In the fall of 1936 the storage inspection included the careful examination of 702,000 bulbs on 18 properties. No infestation was found. 116 bushels of bulbs received the regulation hot water treatment because of nematode infestation at spring field inspection. 517 bushels of bulbs found infested with the bulb fly during the spring field inspection were fumigated.

During the 1937 spring field inspection 16 properties were inspected which included 78 acres. 6 of these properties were found infested with nematode and 1 was found infested with the bulb fly.

During the storage inspection in the fall of 1937, 863,600 bulbs were inspected on 13 properties. No infestation was found. However, 402 bushels of bulbs found infested during the spring field inspection were given the standard hot water treatment for nematode.



NARCISSUS FIELD INSPECTION: AN UMBRELLA IS USED ON BRIGHT DAYS TO SHADE THE PLANTS, IN ORDER THAT DISCOLORATION MAY BE DETECTED, WHICH INDICATES NEMATODE INFESTATION. NEMATODES HAVE KILLED PLANTS CAUSING THE OPEN SPACE IN THE FOREGROUND.

In the spring of 1938, 100 acres on 18 properties were given the tedious field inspection. One property was found infested with nematode and none found infested with bulb fly.

The bulb inspection fee is \$5.00 for three acres or less and \$1.00 for each additional acre inspected. This fee is for field inspection but also includes the storage inspection if bulbs are to be shipped.

These inspections which require painstaking effort were made by Mr. J. A. Harris and Dr. D. L. Wray.

PHONY PEACH AND PEACH MOSAIC DISEASE ERADICATION

This important work is designed to protect the peach growers of North Carolina from the ravages of the dreaded phony and Mosaic peach diseases. The Mosaic disease has not yet been found in North Carolina. The project is carried out in coöperation with the Federal Government.

During the campaign to eradicate escaped and abandoned peach trees in the year 1936, between July 1 to December 31, 377,958 peach trees were removed from 1,740 properties. During 1937, when this work was closed out, 107,195 trees were removed from 2,842 properties.

From July 1 to October 31, 1936 there were 485,846 trees inspected on 11,500 properties. 142 phony infected trees were found on 59 properties. All infected trees were removed.

In June 1937 there was a nursery environs inspection which included 42,233 trees inspected on 533 properties in the vicinity of 21 nurseries in 11 counties. No infected trees were found in the nursery environs inspection which included areas within one mile of nurseries growing peach stock.

The total inspection for 1937 included 73,399 trees inspected on 846 properties in 29 counties. 38 phony infected trees were found on 27 properties. 15 of these infected trees were found in Anson County and 23 in Robeson County. All infected trees were destroyed.

During 1938, 45,871 trees were inspected on 880 properties in the vicinity of 24 nurseries in 11 counties. No infected trees were found in the inspected zone around nurseries. However, 14 infected trees were found outside of the nursery areas as follows: Anson County 9, Robeson County 4, and Stanly County 1. These infected trees were promptly destroyed.

Mr. J. A. Harris was appointed State Coöperator in phony peach and peach mosaic disease work, by the U. S. Bureau of Entomology and Plant Quarantine. Mr. Harris spent the month of May 1938 in New Mexico at the expense of the Federal Government, studying Peach Mosaic which may appear in North Carolina at any time. Inspections for Peach Mosaic are made during the regular phony disease survey. Dr. D. L. Wray has spent much time in this work also. Messrs. T. B. Copeland and J. W. Coble have been assigned to this work by the Federal Government and have rendered valuable service to the State.

Mr. C. H. Hearn of the Federal Bureau of Entomology and Plant Quarantine had charge of the tree removal work during 1936 and 1937 in the State.

INSECT TAXONOMY

Dr. C. S. Brimley has charge of this work and his eminent position in the field of natural history was recognized by the University of North Carolina which conferred upon him the degree of Doctor of Laws at its commencement June 7, 1938.

Doctor Brimley has developed one of the finest insect collections in the United States, consisting of approximately 75,000 specimens representing about 10,000 different species. An excellent card catalog is also maintained. These records go back to 1900 when Professor Franklin Sherman first started keeping records of the insects of North Carolina. A list of the "Insects of North Carolina" by C. S. Brimley, LL.D, a truly monumental work, was published in 1938, making available for general use the valuable records of this Division.

Doctor Brimley identifies hundreds of insects and is also a recognized Herpetologist and Ornithologist. He is also an able Taxonomic Botanist, identifying many species of plants each year.

WHITE FRINGED BEETLE

The white-fringed beetle, previously found in Argentina, Chile, Uruguay and Australia, was found to be doing extensive damage in the vicinity of Floralla, Alabama in 1937. The pest seemed to be such a potential threat to the entire South that the State Entomologist attended a meeting of the Southern Plant Board at DeFuniak Springs, Fla., in July 1937 to look over the infested area and discuss quarantine measures.

In 1938 twelve infested nurseries were found in New Orleans, from which about 600 shipments have been made into North Carolina during the past three years. Shipments had also been made all over the country. As a result another meeting of the Southern Plant Board was held in New Orleans, La., in the summer of 1938 to go more thoroughly into the entire white fringed beetle problem. Federal Quarantine was called for and a public quarantine hearing was held by the Federal Government September 15, 1938, in New Orleans, La.

As the white-fringed beetle attacks corn, cowpeas, cotton, velvetbeans, peanuts, cabbage, sweet potatoes, collards, tomatoes, etc., it is considered a very grave threat to Southern agriculture.

The white fringed beetle has not yet been found in North Carolina, but that is no assurance that it is not already in the State, or will not soon gain entrance.

DIVISION NEEDS

The Division of Entomology is handicapped by lack of travel funds for the staff. The \$4,000 yearly travel allowance is sufficient only for the most urgent demands of the work. Many essential duties such as shipping point and transit inspections, checking on dealers, and other phases of inspection, quarantine and regulatory work must be greatly diminished or entirely omitted.

ACKNOWLEDGMENTS

I wish to acknowledge the splendid interest and support of the Board and the Commissioner. It is also a great pleasure to commend the entire staff of this Division for their loyalty, integrity and efficiency at all times.

WAREHOUSE DIVISION

A. B. FAIRLEY

The State Warehouse System submits the following as a report of the operation of the System for the biennium 1936-1937 and 1937-1938:

The number of warehouses licensed was one hundred and ten (110), with a licensed storage capacity of 550,000 bales of cotton. These warehouses handled about sixty per cent of the North Carolina crop during the past two years, and 456,869 bales were handled during the year 1937-1938. There is now a licensed warehouse in practically every cotton-producing county in the State, and these warehouses are easily accessible to the cotton producers.

The classing department has classed and supervised the classing of approximately 80,000 bales yearly. In order for the classing division to render more prompt and efficient service, contract has been made for the building of a modern and up-to-date classing room, which should be completed by January 1, 1939. In connection with the classing of cotton the division has recently signed a coöperative agreement with the Federal Government whereby the Federal Government is to send a licensed classer and helper, whose office will be in our new classing room, and who will assist our classer in classing cotton raised in North Carolina.

The services of a gin inspector were added September 1, 1937. All gins in the State were visited, and advice and help were given the ginners where it was found necessary, the inspector remedying any mechanical defect found, and helping the ginner correct any faulty or careless ginning. By this service the farmers were saved thousands of dollars, having a better and smoother sample turned out by the gin. Through the continuation of this service it is hoped that as far as possible gin-cut and napped cotton will be eliminated.

During the past year a truck and set of test weights were bought in order to test all gin scales, this division working in coöperation with the Weights and Measures Division in making tests and seeing that the scales are put in condition to insure correct weight determination.

The warehouses at Norlina and Benson, which belong to the State, were again leased, and a good rental obtained.

Warehouses in debt to the State have continued to lower their indebtedness, and have kept up their interest payments. Below is a statement of the interest and principal received during the

past two years; also a statement of the funds of the State Warehouse System.

AMOUNT COLLECTED DURING THE PAST TWO YEARS:

Interest.....	\$ 24,336.83
Principal.....	37,222.30
Total.....	\$ 61,559.13

LOANS TO WAREHOUSES

Sampson Cotton Storage Warehouse Co., Clinton.....	\$ 6,000.00
Lincoln Bonded Warehouse, Inc., Lincolnton.....	3,450.00
Cotton Bonded Warehouse, Lincolnton.....	6,000.00
Union County Warehouse Co., Monroe.....	10,000.00
W. W. Holding, Wake Forest.....	3,500.00
Beaufort County Storage Warehouse Co., Washington.....	5,000.00
Total.....	\$ 33,950.00

	Cash On Hand Principal Fund	Cash On Hand Supervision Fund	Loans—1st Mortgage on Whse.	Invested In Bonds
1937.....	\$ 7,417.10	\$ 47,020.11	\$261,599.00	\$378,000.00
1938.....	\$ 27,391.77	\$ 53,990.62	\$277,818.98	\$333,500.00

PURCHASE OF BONDS DURING BIENNIUM.....	\$ 70,947.48
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DIVISION OF CHEMISTRY

DR. B. W. KILGORE

The Division of Chemistry has the responsibility for the work with fertilizers, foods for human consumption, commercial feeds for livestock and poultry, insecticides and fungicides for combating insects and fungus diseases of plants, and the analysis of a rather large amount of materials of an agricultural nature.

FERTILIZERS

The amount and kind of chemical work performed in the laboratory on fertilizers, feeds, insecticides, cottonseed meals, and materials of a general agricultural nature during the past two years is shown in the following summary:

Official fertilizers	10,178
Fertilizers and fertilizer materials for farmers.....	617
Official feeds	2,196
Miscellaneous feeds	483
Insecticides	85
Cottonseed meals	164
Miscellaneous limes and marls.....	47
Official limes and land plaster.....	32
Total.....	13,802

A considerably larger number of analyses of samples of fertilizers was made during this biennium than during the past similar period. In addition to the regular determinations made on fertilizers heretofore this season is the first time, in accordance with the Act of the Legislature of 1937, that determinations have been made in fertilizers of magnesia and acidity or basicity of the fertilizers. This has required additional help and equipment for the laboratory and we now have adequate facilities in the new laboratories and equipment for making these additional examinations. Information about the magnesia content of fertilizers and the acid or base condition of the fertilizers will prove valuable to farmers in fertilizing their crops on different kinds of soils.

The analyses of fertilizers show that the goods put on the market in this State are what they are claimed to be and are of good quality.

COMMERCIAL FEEDS

The Feed Laboratory has, during the biennium 1936-38, made analyses of 2,196 official samples of feeding stuffs and 483 miscellaneous and unofficial samples. This represents a large increase in volume of work over the preceding biennium.

Laboratory facilities have been improved by repairs to old apparatus, and where necessary, by replacement with new apparatus. Microscopical analysis has been made a part of the regular work of the Feed Laboratory, and now each sample is examined as to its ingredients in addition to the regular chemical analysis. This means that the guarantee of each feed found on sale is checked in every particular. Samples coming into the laboratory have been handled promptly.

The feed bulletins have been published as usual. There have been numbers of samples which failed to comply with their guarantees, but upon the whole there now appears to be a distinct and gratifying improvement in the quality of feeds found on sale.

INSECTICIDES

There has been some increase in the number of samples of insecticides analyzed. These materials have been found to meet the guaranteed analyses, as a whole, and are generally up to standard requirements.

FOODS

The food work concerns sanitation, adulteration, branding and labeling of food products offered for sale in the State. The work is done through inspection of places where foods are made or handled and by examination and analysis of food samples. It includes coöperative work with city and county health departments and with Federal food and drug officials.

During the biennium, 1936-1938, the following samples have been received and analyzed:

Flour	957
Hamburger and sausage	476
Ice cream	1,012
Honey	139
Syrup	63
Coffee	398
Olive oil	46
Mayonnaise	85
Vinegar	273
Extracts	174
Spray residue	320
Soft drinks	60
Oleomargarine	185
Herring roe	71
Canned vegetables	256
Canned fruits	21
Miscellaneous	266
Miscellaneous (unofficial)	335
Total	5,137

CANNED GOODS

A survey has been made of most of the canneries in the State with the view of helping operators of such industries to bring the canned products up to U. S. standard grade. Whenever insanitary conditions were found, such facts were pointed out by the inspectors and recommendations for improvements were made. When samples examined were found that did not meet the requirements for U. S. standard grade, reports were sent to the canners pointing out wherein the sample failed to meet the requirements and advising that such products, unless brought up to standard grade, must be labeled "Below U. S. Standard Grade."

Inspection of the packs at warehouses was made and samples tested in the laboratory. In the cases where mislabeling or misrepresentation of the product by the label occurred, the error was explained and assistance given in proper form of label to comply with State and Federal regulations on labeling. Whenever canned foods, that for any reason, were found unfit for marketing the condition of the pack was pointed out to the canner and the study of the cause for such losses made.

In testing canned goods for quality and proper labeling, the standards promulgated by the U. S. Food and Drug Administration have been used as guides. However, all forms of canned foods packed in the State have been examined, for many of which no specific U. S. standards have been provided.

Observations of the methods from the field to the finished product have been made in large and small canning establishments, and a record of these is available for supervision of these outputs.

ICE CREAM

During 1937 considerable time was given to the inspection and analysis of ice cream and other frozen milk products, efforts in this connection being directed toward the elimination of sub-standard products which, either through deliberate intention or carelessness on the part of the manufacturer, were being made and offered for sale to the public. More than 650 samples of such products were examined during the spring and summer of 1937. At the beginning of the investigation nearly half of the samples examined were below the standard in milk fat, while near the end of the season samples deficient in milk fat were seldom found.

In all cases of ice cream and other frozen milk products found below the standard in milk fat, the manufacturers and sellers of the products were notified of the findings and warnings to desist from such practices were issued, and in cases of material deviation from the requirements of the standards, notices of

hearings were sent and hearings were given to those responding. All cases in which responses to notices of hearings were not forthcoming, and in which warnings were not heeded, the operators persisting in violating the law through the manufacture or sale of products deficient in milk fat; were turned over to the courts for determination. It was found necessary to cause nine prosecutions to be brought, eight of these resulting in convictions. This work has been continued through that portion of 1938 falling within the biennium.

Early in 1937, under authority granted by the Ice Cream Plant Inspection Law, Sanitary Regulations were drawn up which were intended to give greater direct effect to the broad general provisions of that law. On October 19, 1937, in response to invitations sent to all manufacturers of ice cream and other frozen milk products, a large number of such manufacturers met in conference with officials of the Department in Raleigh to consider the provisions of the regulations. At this meeting a Code of Sanitary Regulations to govern the operation of the large production type of ice cream plants, and revised Definitions and Standards for Ice Cream, Other Frozen Milk Products and Water Ices were agreed upon. The operators of counter type ice cream freezers requested and were granted an extension of time to prepare for their conference. On November 16, 1937, a conference was held with this group of manufacturers and a Code of Regulations governing the operation of Counter Type Ice Cream Freezers was agreed upon. The group had previously agreed upon the revised Definitions and Standards.

Both Codes of Sanitary Regulations were submitted to, and adopted by the Board of Agriculture on March 10, 1938, which action made the Codes a part of the Law, violation of which carries the same penalty as does a violation of the law itself. The revised Definitions and Standards for Ice Cream, Other Frozen Milk Products and Water Ice were adopted by the Board of Agriculture on June 28, 1938, under authority granted by the North Carolina Pure Food Law.

Under these Regulations, and for the first time since Ice Cream Plant Inspection was begun, a systematic grading of plants has been undertaken. Practically all of the plants in the State making ice cream and other frozen milk products have been inspected and graded since the adoption of the Regulations. Seven plants which did not score the required grade and could not be so improved as to make such grade possible were either closed voluntarily by the owners or by order from the Department. One manufacturer whose place was thus closed has remodeled his building and installed new machinery of approved type and has

been permitted to reopen, having received satisfactory rating upon inspection of the new installations. Nine tub type freezers using ice and salt as refrigerant have been replaced by freezing machines of either circulating brine or direct expansion type.

With a few exceptions, the operators of Counter-Type Ice Cream Freezers have made the installations, or changes in installation, necessary to bring their machines into conformity with requirements of law.

OLEOMARGARINE

The Oleomargarine Excise Tax Law provides that an excise tax of 10 cents per pound shall be levied and collected on all oleomargarine containing any fats or oil other than "cottonseed oil, peanut oil, corn oil, soya bean oil, oleo oil from cattle, oleo stock from cattle, oleo stearin from cattle, neutral lard from hogs or milk fat."

185 samples of oleomargarine were bought and examined for total fat and for the presence of "foreign fats"—those not specifically named in the Oleomargarine Excise Tax Law. Of this number 20 samples, representing 9 different brands, from 6 different manufacturers, were found to contain cocoanut oil, palm oil or "Babassu" oil, rendering them subject to the excise tax. It was found that one manufacturer had shipped slightly more than 3000 lbs. of such oleomargarine into the State, another had sold 122 lbs., the other shipments found being so small as to be almost negligible.

The sum of \$311.80 in excise tax has been collected to date during the year 1938. The investigation is still under way.

The 185 samples examined represent 55 separate brands of oleomargarine produced, and sold in this State, by 24 different manufacturers. Inspectors are instructed to take samples of each and every brand found. Inspection covers all grocery and other stores where oleomargarine is offered for sale.

SPRAY RESIDUE

Regulations were adopted providing for the testing and regulation of spray residue on fruits. Much useful information on the amount of spray residue on the fruit being packed for market has been supplied growers of peaches and apples.

The tolerances adopted are the same as the Federal allowances, and are:

Arsenic, as As_2O_3.....	.01	grains per lb.
Lead, as Pb. ....	.018	grains per lb.
Fluorine, as F. ....	.01	grains per lb.

State inspectors have covered the orchards during the seasons of maturity of both peaches and apples and samples of brushed

and unbrushed fruit were tested and the growers shown the efficiency of their method of removal of spray residue.

FLAVORING EXTRACTS

Regulations defining and adopting standards of classification for all flavoring extracts and flavors have been adopted by the Board of Agriculture. This action was taken to eliminate from the market many spurious or worthless flavors which had flooded the market. These minimum standards have been provided for "Vanilla and Vanillin Extracts", "Vanilla-Vanillin-Coumarin" or "Vanilla-Vanillin-Coumarin Extracts," also "Imitation Vanilla Flavor."

COFFEE AND VINEGAR

As coffee may be mixed with chicory or cereal and be legally sold, if properly labeled, violations of the food law in the sale of coffee were largely due to mislabeling. When such violations were found, the attention of the manufacturer or jobber was called to the fact, and the product was either taken off the market by the responsible party or was relabeled to comply with the law.

There was found offered for sale in the State large quantities of so-called vinegar, which in fact was not vinegar but dilute commercial acetic acid, a product not recognized as a food by either the Federal food law or the State food law. The sale as vinegar was a misrepresentation and gross fraud. One party engaged in the manufacture and sale of this product was indicted and convicted. More than five thousand gallons were withdrawn from sale and either destroyed or permitted to be used for other than food purposes. Others guilty of the same violation, upon agreement to discontinue the practice, were not prosecuted as it was their first offense.

MISCELLANEOUS WORK

A total of 335 unofficial samples was received, 254 of which were suspected to contain poison. These samples consisted of foods and beverages for human consumption, animal and poultry feeds, viscera and other specimens from animal bodies; and miscellaneous specimens for the detection of narcotic or other illegally used drugs, and for foreign and harmful ingredients. These samples were variously submitted by city and county officials, physicians, county agents, farmers' coöperatives, farmers and other citizens at large. Poisons and foreign substances were found in a considerable number of instances and questions regarding safety and wholesomeness were cleared up in many cases.

There were 41 requests for mineral analysis of water, most of which were to determine why the water was not satisfactory for industrial, commercial and domestic purposes, or why sediment or scum appeared and why pipes rusted unduly. In almost every instance, the request was made to obtain practical information.

INSPECTIONS

Inspections have been made as follows:

	Number of Plants	Number of Inspections	
Bakeries.....	151	1,055	
Bottling plants.....	228	1,541	
Ice cream plants and creameries.....	247	1,508	
Total.....	626	4,104	4,104
Number of inspections of canneries: seafood and vegetables.....		135	135
OLEOMARGARINE INSPECTIONS: (Grocery stores, restaurants, etc.)			
Places handling or using oleo.....		4,489	
Places not handling or using oleo.....		7,800	
Total.....		12,289	12,289
Total number of inspections.....			16,528

Two bakeries were closed on account of insanitary conditions. One was cleaned up and permitted to reopen after being passed on by an inspector. The other was not reopened.

SEIZURES, WITHDRAWALS, ETC.

Oleomargarine containing foreign fats offered for sale in violation of the Oleomargarine Law and on which excise tax was collected.....	3,118 lbs.
Commercial acetic acid sold as vinegar, either destroyed or permitted to be used for other than food purposes.....	5,380 gallons.
Herring roe containing worms and other objectionable substances which rendered the product unfit for human consumption.....	120 cases of 24 cans each.
Cut string beans in corroded cans or containing worms, insects or other foreign and objectionable matter.....	15 cases of 24 cans each.
Infested peas unfit for human consumption.....	613½ cases.
Assorted cakes, moulded and insect infested.....	56 lbs.
Fruit preserving powder.....	20 packages.
Lemon flavor, worthless as a flavoring product.....	5 doz. bottles (Pint).

LINSEED OIL

Of the 80 linseed oil samples obtained and analyzed, only one failed to meet the requirements for linseed oil.

Funds for enforcing the food and sanitary inspection laws are provided by inspection taxes under the following inspection laws:

Bleached flour	28,335.00
Bakeries	2,865.00
Bottling plants	4,822.50
Ice Cream plants, Creameries	4,535.00
Linseed oil	4,692.90
Total	45,250.40

The chemists in the laboratories, the inspectors in the field and the workers in the office have performed most agreeable, satisfactory and efficient services, for which they have our sincere appreciation.

SEED LABORATORY

J. W. WOODSIDE

There has been considerable increase in the work of the Seed Laboratory during the biennium, each year having established a new high in the work done by the Division. The year 1936-1937 showed an increase of 22% over the previous year, and the year of 1937-1938 showed an increase of 68% over the year 1936-1937. During the biennium, July 1, 1936 to June 30, 1938, 20,714 samples of seed were analyzed by the Seed Laboratory, representing an increase of 65% over the biennium, July 1, 1934 to July 30, 1936. This increase in volume of work has been accomplished by increasing the laboratory personnel of the Division from six to seven.

Our primary objective during the past two years has been to see that the seed purchased by the farmer were properly labeled as to quality. In the past, due to insufficient or improper labeling, there have been instances in which inferior seed have been sold in unfair competition with seed of superior quality. Another condition that has made strict enforcement of our Seed Law imperative, is the fact that some of the states bordering on North Carolina are rigidly enforcing their seed laws, thus creating a tendency to "dump" in this State the seed of poor quality rejected by the neighboring states, prevention of which must be a constant aim of this Division.

During 1937, in coöperation with the Extension Service seventy meetings were held in all sections of the State. The purpose of these meetings was to better acquaint both farmers and seed dealers with the requirements and purposes of the Seed Law.

The Seed Laboratory, for a number of years, has made it a policy to clean tobacco seed for farmers requesting this service. During the biennium 645 lbs. of tobacco seed have been cleaned for farmers in Wake and adjoining counties. This represents about one-third of the volume of work done when the program was at its peak. The greater portion of this work is now being done locally by agricultural teachers and county agents which accounts for the reduction in volume of this type of work done by the Division during the past two years.

After a careful study of the equipment and methods used in the seed laboratories of other states, equipment was purchased for the North Carolina Laboratory during 1937, installation of which has made it one of the best equipped seed laboratories in the South. Seed germinators with automatic temperature control have been installed to insure the best possible conditions for

germination tests. The installation of a modern automatic seed counter has greatly increased the capacity of the Laboratory.

STATISTICAL REPORT

	1936-1937	1937-1938
Current tests.....	7,633	12,368
Inspectors tests:		
Agricultural seed.....	65	180
Vegetable seed.....	33	435
	<hr/>	<hr/>
	7,731	12,983
Total for the biennium.....		20,714 samples
Tobacco seed cleaned.....	382 lb. 4 oz.	263 lb. 6 oz.
Total for the biennium.....		645 lb. 10 oz.

DIVISION OF MARKETS

RANDAL B. ETHERIDGE

The Division of Markets is a service organization. It assists the farmers in marketing products grown on the farm. That is true in its broadest sense, but in addition to helping farmers market their products, whether individually or in groups, quite often it is necessary to show them how to prepare their output for market. This is particularly true of fruits and vegetables. Members of the Division also act in a neutral capacity in certifying as to grade the various farm commodities. If, for example, we certify as to grade a car of Irish potatoes, a car of soybeans, or a car of lambs, the farmer sells these on the basis of the grade assigned.

The Division works with farmers in various coöperative projects, such as coöperative purchasing of supplies and coöperative marketing. If the farmers desire to work together as a group in purchasing supplies or marketing their farm output, then they should protect themselves legally by having their organizations incorporated.

The problem of selecting markets requires a variety of information on supply, demand and prices that individual farmers are not in position to collect for themselves. The Division maintains a Market News Service which is designed to fill this need.

During the biennium the work of the Division has been more varied than in any previous period due largely to the new projects initiated by the Federal agencies in an attempt to improve the economic position of the farmers. We have participated and coöperated as much as our personnel would permit. Also during the biennium we started other new projects of work which should prove beneficial to the farmers of North Carolina.

A brief summary of the activities, nature and scope of the work is as follows:

MARKET NEWS SERVICE

For a number of years we have issued daily mimeographed reports, in coöperation with the Bureau of Agricultural Economics, from our temporary field offices. The reports issued at Chadbourn dealt with strawberries; those at Washington with Irish potatoes; and the ones from Hamlet with peaches and watermelons.

Reports issued showed the total U. S. carlot shipments by states, primary destinations of North Carolina carlot shipments, Potomac Yards passings of North Carolina shipments, shipping

point prices in North Carolina and competitive states. Telegraphic reports were received from wholesale terminal markets, which included weather conditions, number of cars on track, the number of cars unloaded and the number of carlot arrivals. The telegraphic reports also indicated market trends for North Carolina and competitive sections. Arrivals and truck holdings in the sixteen leading cities were given daily.

From the information referred to in the foregoing, requirements of every distributing center can be known along with existing supplies, and the shipper can ascertain at a glance which markets have a strong demand and which markets are weak, and in having this information, he will be in a position to know where there are dangers of losses and avenues of gain.

Farmers cannot market intelligently unless they know the market value of their products. With that in mind, we have endeavored to make available to the farmers of North Carolina market information concerning a number of commodities which is accurate and reliable, and which will facilitate the flow of these items to markets where they are most needed, and place farmers on an equal bargaining basis with their customers and competitors.

It is our desire to aid producers directly by familiarizing them with prices being paid for commodities in various markets. While the quotation of prices is the most emphasized phase of the work, there is reason to believe that other price-making forces disseminated by the Market News Service is important in regulating the flow of commodities to market. Supplementary information is received in our office over leased wire in coöperation with the U. S. Department of Agriculture and all reports issued are in coöperation with the Federal Department.

Market information developed during 1938 and made available to the producers, the press and for radio is as follows:

- 660 North Carolina producers receive each week by mail a market report on poultry and eggs.
- 635 Hog producers receive each week by mail a market report on hogs.
- 380 Sheep, lamb and wool producers receive each week a market report on sheep and wool.
- 190 Weekly and daily newspapers receive each week a weekly summary of livestock and vegetable prices and trends.
- 1,500 Words, or 3½ double-spaced typewritten pages, are prepared each morning for broadcast over Station WPTF at Raleigh at 12:40 P.M. These radio releases carry the very latest price information from shipping points and terminal markets on tobacco, cotton, livestock, hay, feed and grain, and fruits and vegetables.

For the press each day approximately 5,000 words are written as follows: 1,400 on fruits and vegetables and 700 on livestock for the News and Observer, Greensboro Daily News, Durham Sun, High Point Enterprise and the Journal-Sentinel in Winston-Salem. 1,500 words are pre-

pared for the Raleigh Times and the Associated Press on fruits and vegetables, livestock, poultry and eggs.

400 Words on cotton are released daily for the Associated Press and the Raleigh Times.

450 Words on tobacco trading are assembled daily during the marketing season for the Associated Press, United Press, News and Observer and the Raleigh Times.

300 Word reports for the Raleigh Times on Raleigh prices of every day table needs are released daily.

From time to time special reports on carlot shipments, Potomac Yards passings, outstanding sales, etc., are issued to the press. Special reports calculated to be of value in farm management and marketing problems which confront North Carolina farmers are given wide publicity through the press and by radio.

TOBACCO STANDARDIZATION

A tobacco marketing specialist was added to the staff in 1937 so that farmers might be taught approved and efficient methods of preparing tobacco for market. This work has proven very popular and is in strong demand. In order that all requests for demonstrations could be taken care of, a coöperative agreement was made with the Bureau of Agricultural Economics for additional part-time help. Proper sorting, tying, grading and arranging of tobacco on warehouse floors are features of the work. Partial scope of the project is listed below.

A. Sixteen demonstrations attended by 375 farmers were held in Hoke, Nash, Wayne and Franklin Counties. Between these meetings individual instruction was done on warehouse floors in Durham, Farmville, Greenville, Goldsboro, Oxford, Wendell and Wilson.

B. Special effort was exerted toward teaching proper marketing procedure in the Burley Belt as growers there have generally less experience in tobacco production than farmers in most other tobacco-producing areas of the State. Two sorting and tying demonstrations were held in each of the following Counties: Alleghany, Avery, Ashe, Cherokee, Clay, Graham, Jackson, Macon and Mitchell. In the largest producing counties, which include Buncombe, Haywood, Madison and Yancey, three demonstrations were held. A total of 2,035 tobacco producers attended meetings held in this area. These meetings were followed up with individual instruction on the Asheville market.

C. The subject of tobacco standardization was discussed with 350 vocational agricultural students in regular class sessions in the Counties of Franklin, Harnett, Vance and Wake. One adult evening class, consisting of eighteen farmers, attended one of the class room sessions.

LIVESTOCK MARKETING

A livestock grading and marketing program was instituted July 1, 1937. The most complete project undertaken in livestock marketing was that of marketing lambs. This program was carried on in coöperation with the North Carolina Agricultural Extension Service. During this period 4,681 lambs belonging to some 450 farmers were officially graded and marketed coöperatively. The animals originated in the counties of Alleghany, Ashe, Camden, Currituck, Pasquotank, Edgecombe, Pitt, Tyrrell, Washington and Watauga. Some of the cars were sold direct, whereas others were shipped on consignment. In merchandizing every shipment, a substantial sum of money was made for the producer and this would not have been possible without a knowledge of characteristic seasonal price movements, the influence of given factors on short-time and a day-price movement, acquaintanceship with the trade, the ability to choose superior customers for the time being, as well as the ability to distinguish price-limit stretches of given customers. The work was not accomplished by any one individual or organization. The county agents, with the aid of an animal husbandry specialist, did the assembling; the grading was accomplished by members of this Division with the aid of an extension specialist, and the selling was done by our marketing specialist. Naturally, he consulted freely with the men previously mentioned.

Only one livestock auction market was in operation in Eastern North Carolina during the period being reviewed, this at Kinston. A local man was trained as a hog grader for this market with the result that the market operator was able to negotiate sight-unseen sales with packers. Livestock auctions are also in operation at Asheville, Charlotte and Greensboro. The Division is in position to offer experienced advice on most any phase of livestock marketing.

Effort was also exerted to keep out-of-state customers aware of sources from which they might secure livestock needed from people or markets in North Carolina. Leading cattlemen in Virginia, West Virginia and Tennessee were circularized with lists showing feeder cattle for sale in this State. Contact with leading packers and livestock marketing organizations in the East were maintained well enough to cause their buyers to be sent to North Carolina on purchasing errands when volume permitted.

The soft and oily system of hog marketing, which virtually gives price-fixing privileges to buyers, was called to the attention of the United States Department of Agriculture, and publicized

sufficiently to bring about public consciousness of the problem. Correction of the injustice demands Federal rather than buyer inspection.

EGGS

Certification as to the grade of eggs was inaugurated June 1, 1937. This project of work was executed jointly with the Mountain Egg Producers Coöperative Association, Asheville, the Farmers Federation, Asheville, N. C., and the Farmers Coöperative Exchange, Raleigh, N. C. One member of the Division was licensed by the Federal Department as a supervisor, and he, in turn, trained and licensed employees of the Associations. The licensed inspectors certified 26,670 dozens of eggs. We have had a number of inquiries from other sections regarding this type of work and we feel safe in saying that it will be expanded in the very near future.

Egg grading and marketing was also done for the Albemarle FCX Service, Elizabeth City and for the Edgecombe FCX Service, Tarboro. The work around Elizabeth City and Tarboro was started primarily for the purpose of relieving the local markets of their surplus during the spring season. Eggs were candled, graded and shipped to Richmond, Washington and New York. The eggs shipped to Richmond were stored and sold during the autumn months.

STRAWBERRY STANDARDIZATION

In our inspection work of strawberries during the past ten years, we have seen the need of some intensive demonstration work in the preparation of this commodity for market. During the 1937 season we assigned one member of the Division to the Chadbourn area for a period of three weeks to teach growers how to improve their pack. This project was carried on in coöperation with the assistant county agent of Columbus County. The increased returns to growers who packed strawberries according to our specifications and method of pack was quite noticeable and was recognized by all on the Chadbourn market. Data collected show that those growers received from thirty cents to one dollar per crate more than the other growers. There was a good active demand for properly packed berries, and it is interesting to note that the wholesale dealers in the terminal markets instructed their buyers on the Chadbourn market to buy berries which were packed under our supervision. Beneficial work of this character can be carried on profitably at all shipping points marketing perishable commodities.

SHIPPING POINT INSPECTION SERVICE

The inspection and certification as to grade of fruits and vegetables is by far the largest project in the Division. This work is done in coöperation with the Bureau of Agricultural Economics, and is given voluntarily by the growers and shippers. We are required to make the work self-supporting and the fees charged for the inspection are paid by the growers or shippers for whom the inspections are made. All men engaged in the work are licensed by the Federal Department and act in a neutral capacity in describing the quality and condition and certifying as to grade. A greater part of the produce shipped from North Carolina is bought and sold on the basis of grade assigned by the inspectors. This service aids the growers and shippers materially in marketing their products. The volume of fruits and vegetables inspected was as follows:



CANTALOUPE OF UNIFORM SIZE AND ATTRACTIVELY PACKED COMMAND THE HIGHEST MARKET PRICE.

COMMODITY	Approximate No. of Packages	Carlot Equivalent
Cabbage.....	7,296,000 (pounds)	304
Irish potatoes.....	4,688,281 (100 lb. sacks)	15,627
Watermelons.....	1,461,734 (melons)	1,461
Strawberries.....	781,910 (24-qt. crates)	2,659
Peaches.....	508,391 (bushels)	1,313
Snap beans.....	459,631 (bu. hampers)	766
Cantaloupes.....	91,488 (crates)	228
Green corn.....	79,884 (crates)	159
Sweet potatoes.....	72,225 (bushels)	120
Fresh Peas.....	61,201 (bu. hampers)	102
Cucumbers.....	57,365 (bu. hampers)	111
Tomatoes.....	27,706 (lugs)	50
Apples.....	21,718 (bushels)	43
Dewberries.....	9,311 (24-qt. crates)	26
Huckleberries.....	3,873 (24-qt. crates)	15
Peanuts (shelled stock).....	2,740 (112-lb. sacks)	10
Radishes.....	1,000 (crates)	2
Peppers.....	481 (bu. hampers)	1
Lima beans.....	154 (bu. hampers)	
Squash.....	97 (bu. hampers)	
Onions.....	5 (bu. crates)	
Plums.....	3 (bu. baskets)	
Peanuts (Farmer stock; State Inspection).....	540,227 bags	2,160

This work required a personnel of 134 licensed inspectors during the heavy movement of potatoes in June 1937 and 140 during June 1938. To employ that many men on a temporary piece of work, to see that they are properly trained, equipped and supervised is a tremendous undertaking and requires careful and detailed planning months in advance. To give you an idea of the magnitude of this work, I wish to advise that the number of licensed inspectors required to do the work by weeks in 1937 was as follows:

Week ending April 21st.....	5 men	Week ending June 26th.....	116 men
Week ending May 1st.....	32 men	Week ending July 3rd.....	60 men
Week ending May 8th.....	36 men	Week ending July 10th.....	32 men
Week ending May 15th.....	41 men	Week ending July 17th.....	41 men
Week ending May 22nd.....	42 men	Week ending July 24th.....	43 men
Week ending May 29th.....	32 men	Week ending July 31st.....	41 men
Week ending June 5th.....	77 men	Week ending August 7th.....	19 men
Week ending June 12th.....	133 men	Week ending August 14th.....	4 men
Week ending June 19th.....	134 men	Week ending August 21st.....	3 men

The foregoing does not include typists, clerical assistants and helpers.

A majority of the men employed during April and May were transferred to other States after the work on strawberries was completed and many of them did not return for other work during the entire season. The greater number of men employed during June constituted a different group of inspectors and many of these men were transferred to other States when no longer needed in North Carolina. Most of the men who inspected watermelons and peaches during July and August represented an entirely different group from that used during any other marketing period. Attention is called to the fact that three different groups

of men were used, each group being qualified by training and experience to inspect certain specific commodities.

Temporary offices for cucumbers were maintained at Jacksonville, Mt. Olive, Calypso and Wallace; for strawberries at Chadbourne, Tabor City, Wallace, Rose Hill, Burgaw, Mount Olive and Warsaw; for potatoes at Tabor City, Elizabeth City, Mt. Olive, Aurora, Bayboro, Columbia, Beaufort, Bethel, New Bern, Pantego, Washington, Creswell, Grifton and Goldsboro; for green corn at Wallace; for tomatoes at Beaufort, Windsor and Laurinburg; for cantaloupes at Laurinburg, Norlina and Ridgeway; for cabbage at New Bern, Beaufort, Fayetteville, Rowland, Elizabeth City and Smithfield; for peaches at Candor, Hamlet, Pinehurst, Sanford, Gibson and Ellerbee; for watermelons at Raeford, Beaufort, New Bern, Mt. Olive, Laurinburg, Hamlet, St. Paul, Rowland and Faison; for beans at Tabor City, Mt. Olive, Richlands, Burgaw and Goldsboro; for cannery tomatoes at Greensboro; for fresh peas at Columbia; and for sweet potatoes at Elizabeth City.

TERMINAL MARKET INSPECTION

Inspections of twenty-five cars of tomatoes, onions, Irish potatoes, grapes, beans, oranges and grapefruit were made at the following terminal points, Asheville, Boone, Charlotte, Durham, Raleigh, Rocky Mount and Sanford. Inspection and certification as to grade of fruits and vegetables grown in the State and shipped to other States are classed as Shipping Point Inspection. Inspections made on commodities grown in other States and shipped into this State are referred to as Terminal Inspections. In Terminal Inspections members of the Division describe the conditions of the commodity upon arrival. Inspections of this kind are requested only when the product is of a quality and condition considerably below that of a recognized standard and adjustments in the price originally agreed upon are made by the shippers and receivers.

Soybeans: Inspection of this crop was continued at Elizabeth City and Washington. During this period 12,675 bushels were certified as to grade.

STABILIZATION OF THE IRISH POTATO INDUSTRY

At the request of the growers and shippers, and representatives of the different agricultural institutions in the State, Mr. A. E. Mercker and Saxon D. Clark, of the Agricultural Adjustment Administration, were assigned to North Carolina in 1937 and 1938, respectively. Messrs. Mercker and Clark worked very closely with the growers and shippers during the marketing period and endeavored at all times to keep a uniform price at all

shipping points. Mr. Mercker had to leave the State for a short period in 1937 and one member of the Division carried on the work during his absence.

FEDERAL SURPLUS COMMODITIES CORPORATION

Irish Potatoes: At the beginning of the potato marketing season in 1937, it was quite apparent that there was a heavy production of potatoes in all of the early-producing States, and it was feared that the price would drop to such a low level that it would be disastrous to the growers. Furthermore, there was serious doubt as to whether the country could consume the potential tonnage during the marketing period. Members of the Division fully realized the gravity of the situation and were very active in having the Federal Surplus Commodities Corporation buy potatoes in North Carolina. The Corporation paid the prevailing market price and there is no doubt that the price of potatoes would have reached a much lower level had they not instituted a purchasing program. The Corporation bought 1,631 cars of North Carolina potatoes at shipping points and in the terminal markets for which they paid \$391,440.00. We assigned one member of the Division to their office in Washington, N. C., for a period of nearly two weeks to assist them in completing their records in order that payment to the growers might be expedited. During the potato marketing season, we had 134 licensed inspectors in the field and the entire personnel acted as agents for the Corporation in carrying out the program.

Sweet Potatoes: The Jersey type of sweet potatoes is grown in the Counties of Currituck and Camden. Shortly after the marketing season started in August 1937, the market became badly demoralized, and we requested the Federal Surplus Commodities Corporation to give the growers in those counties some relief in buying part of the crop. A representative from the Corporation started a purchasing program on August 25th. A purchasing program of this kind removes from the market part of the surplus and thereby strengthens the market and in most instances prevents a further demoralization. \$19,544.40 was paid to the growers for the 42,000 bus. of sweet potatoes bought.

Apples: A large crop of apples in 1937 forced the market price to a low level. The Corporation also came to the rescue of the growers and bought twelve cars of apples. Purchases made amounted to \$3,600.00.

Cabbage: The price for which cabbage was selling at the terminal markets in 1938 was insufficient to pay marketing costs. Again we asked the Corporation to relieve the situation and pointed out that shipments would scarcely bring the cost of

transportation. They aided the growers through buying 328 cars. In this, as in other purchasing programs, the cabbage was bought on the basis of certification as to grade made by our inspectors, and the inspectors also certified as to the weight of each grower's lot or load. The value of the cabbage bought amounted to \$35,412.00.

Snap Beans: The market on snap beans also proved unsatisfactory to growers in 1938. The Corporation bought 15,825 bushels of beans from the sections around Tabor City and Franklin, for which they paid \$6,681.00.

PEANUT PROGRAM—AGRICULTURAL ADJUSTMENT ADMINISTRATION

The diversion program in 1937 was put into effect to help maintain prices and under the program excess supplies were sold to mills to be converted into oil and by-products. The Agricultural Adjustment Administration made payments to the growers' coöperative covering the difference between the prices paid by mills for peanuts crushed into oil and by-products and the established prices of \$65.00 per ton for Class A; \$61.00 per ton for Class B; and \$57.00 per ton for peanuts which were not marketed for the edible trade.

Licensed inspectors of the Division certified as to grade the 49,861,578 pounds (24,930 tons) of peanuts that were bought at a cost of approximately \$1,608,256.00. The classification of peanuts bought was as follows: 44,367,768 lbs. as Class A; 4,847,325 lbs. as Class B; and 637,485 lbs. as Class C.

Specialists in the Division were closely affiliated with the program in all its aspects. One member wrote the articles of incorporation, by-laws, and assisted in getting the charter of the Peanut Stabilization Coöperative, Inc., and helped in other matters pertaining to a corporate set-up. Other specialists trained and supervised the twenty-seven inspectors who were licensed by the Department, and who certified as to grade the 24,930 tons of peanuts received at the forty-eight warehouses in Colerain, Windsor, Jackson, Whitakers, Tarboro, Plymouth, Aulander, Roanoke Rapids, Rocky Mount, Greenville, Gates, Woodland, Edenton, Ahoskie, Weldon, Scotland Neck, Williams-ton, Robersonville, Seaboard, Everetts and Wilmington.

FRUITS AND VEGETABLES

Assistance was given relative to justifying the need of a marketing agreement for merchandising watermelons. An agreement was adopted and proved beneficial to North Carolina farmers.

Information showing why various cars of potatoes failed to grade U. S. No. 1 was compiled from 8,000 inspection certificates, and this information was conveyed to farmers at twelve meetings



WELL-GRADED POTATOES BRING THE FARMER PREMIUM PRICES

in the commercial producing areas which were attended by 800 potato producers. Better harvesting and marketing practices were also emphasized at these meetings.

Food and Drug Act: Just prior to the 1937 Irish potato marketing season, we were advised that the misbranding feature of the Food and Drug Act would be rigidly enforced. Heretofore, it had been a common practice in certain producing areas to fill the bags with potatoes which were branded "100 lbs. net when packed," and in many instances there were less than 100 pounds of potatoes in the bag. We held meetings at a number of the larger shipping points in the potato-producing sections and advised the growers and shippers of the action which would be taken by the Federal Department. It was also pointed out that growers are not required to stamp the grade on any given package of fruit or vegetables, but if they did so, it would be necessary for the contents of the package to conform to the grade as stamped, or there would be a violation of the law. Attention was called to the fact that a number of seizures had been made in connection with the misbranding of fruits and vegetables.

Processing: The canning industry in many States is an important one. We have made an effort during the last five years to

get an industry of this character started in North Carolina, and are pleased to advise that some results have been achieved. The Guilford Coöperative Cannery, Greensboro, N. C., has a potential seasonal output of approximately 25,000 cases of canned goods which are composed of beans, tomatoes, soup mixture, squash, huckleberries and tomato juice. In connection with this coöperative cannery one member of the Division devoted considerable time helping secure a loan from the Bank for Coöperatives, Columbia, S. C. The Eastern North Carolina Farmers Coöperative, Goldsboro, N. C., was sponsored by the Resettlement Administration, and secured their working capital from them. The Federated Coöperative Exchange, New Bern, N. C., was also sponsored and financed by the Resettlement Administration. The T.V.A. recently undertook a cannery development program in Western North Carolina with the idea of providing a market for surplus fruits and vegetables produced in that area. A number of canneries have been established and are reported to be operating successfully.

Watermelon Rate Case: In March, 1937, the Division was represented at a hearing before the Interstate Commerce Commission in Atlanta, Ga., at which time a reduction was requested in the rates on watermelons from the Southeastern States. Considerable data were compiled and presented to the Commission in support of lower rates on this commodity.

MUTUAL AND COÖPERATIVE ORGANIZATIONS

Sixty-two mutual exchanges, coöperative organizations and soil conservation associations were incorporated. Members of the Division not only wrote the articles of incorporation and by-laws for many of the exchanges and associations, but gave them assistance in getting their charters and other matters pertaining to a corporate set-up.

The law under which the mutual exchanges and coöperative associations are incorporated requires that they make annual financial reports to the Division of Markets. One member of the Division visited and assisted virtually all of the mutual exchanges and coöperative associations in the State in making these reports. Considerable correspondence has been exchanged between members of this Division and these organizations to clarify their status under the Revenue Act of 1937.

One member of this Division spent considerable time with farmers in the vicinity of Guilford College who own and operate their own telephone system. It was found that they were in difficulties in regard to their property and property rights and charter powers, and it required several meetings to get the

matter cleared up. It was learned that their charter had been lapsed for a period of ten years and that the only way they could recover possession of their property was to re-incorporate under the same law and with the same provisions. This organization is operated on a mutual plan but is incorporated under the general corporation law.

ACKNOWLEDGMENTS

In concluding this report, I wish to acknowledge your interest in and support of the work of the Division of Markets. It is a pleasure, too, to refer to the loyal and enthusiastic services of the personnel of the Division. Grateful acknowledgment is also made for the hearty coöperation this Division receives from the project leaders and others of the Bureau of Agricultural Economics with whom we have coöperative agreements.

DIVISION OF TEST FARMS

F. E. MILLER

The six Test Farms have made considerable progress during the past biennium, and it is the purpose of this report to present the program of work with brief statements as to the results secured from the many projects underway.

COÖPERATION

The experimental work on the Test Farms, consisting of 142 projects, is handled in coöperation with the North Carolina Agricultural Experiment Station at the North Carolina State College of the University of North Carolina, and with the United States Department of Agriculture. This coöperative arrangement allows for an enlarged program of investigational work. The coöperating agencies also aided in planning, financing, and carrying forward the experiments. All coöperative investigations receiving Federal support are covered by formal memorandums of agreement, which are signed by the executive officers of the agencies contributing to the projects.

The research work on the Test Farms, in the laboratories and elsewhere, is under the control of the Director of the N. C. Agricultural Experiment Station. The Director of Test Farms also serves as Assistant Director of the Experiment Station.

GENERAL

The appropriation to the Test Farms Division for the past fiscal year was the largest in the history of the Station Farms. This allowed for an enlarged experimental program to help meet the increasing demands for new information on farm production problems, the purchase of additional land, to take care of needed repairs and the purchase of new equipment. This improvement program will be given more in detail under the following reports by each Station.

In carrying out the provisions of S. B. No. 127, "AN ACT PROVIDING FOR THE ESTABLISHMENT OF AN EXPERIMENT FARM FOR THE STUDY OF PEANUT GROWING," passed by the 1937 General Assembly, 248 acres of land adjoining the Upper Coastal Plain Station were purchased during November, 1937. For carrying the peanut experimental work further, three or more acre areas have been leased in Northampton, Halifax, and Perquimans Counties. The additional land at the Upper Coastal Plain Station will be used as the base for peanut investigations, dealing with lime, fertilizer, breeding, rotations and disease con-

trol studies. The outlying leased areas will be used primarily for the study of the control of peanut diseases, supplemented with variety and rotation tests. The peanut experiments were started in the spring of 1938 on the above locations and indications point to the securing of much needed information.

One of the most valuable improvements from the standpoint of increasing the usefulness of four of the Station farms is good roads. The State Highway and Public Works Commission has further emphasized their willingness to cooperate with agricultural agencies. State Highway No. 401, leading from U. S. 117, to the Coastal Plain Station, a distance of one mile, was paved the summer of 1937. The following roads leading to the Experiment Stations are being paved at this writing, or are approved by the Highway Commission for pavement within the next few months.

The Cokey road, beginning at State Highway No. 43, and running by the Upper Coastal Plain Station in Edgecombe County, a distance of four miles.

The Pike road, beginning at State Highway No. 97, and running to the Blackland Station in Washington County, a distance of nine miles.

The County road, beginning at State Highway No. 90, at the Piedmont Station property line in Iredell County and running North through the Station property, a distance of approximately one-half mile.

With the completion of the pavement of these roads, all of the six Test Farms will be connected by hard-surfaced highways.

The Stations have continued to hold the Annual Farmers Field Days. These meetings are attended each year by approximately 22,000 people. Several other meetings are held on the Stations during the year, such as: "Livestock Day" at the Blackland Station; "Small Grain Day" at the Piedmont Station; "Swine Day" at the Coastal Plain Station; and "Tobacco Conference" at the Tobacco Station. In addition, the County Agents and Teachers of Vocational Agriculture bring groups of farmers to the Stations to study the various experiments. In all, the number of visitors to the Stations is increasing each year, a fact which further emphasizes the popularity of the Station farms.

RESEARCH

The following will give the progress report by Stations. In reporting on the experiments, the name of the specialist leaders will be given and it is understood that the Assistant Director in Charge also contributes to each project, in addition to his duties as the administration officer of the Station farm.

TOBACCO STATION—OXFORD, N. C.

E. G. Moss, Assistant Director in Charge and
Senior Agronomist, U. S. D. A.

Station Established in 1912.

Area of Station, 250 Acres. Soil Type, Durham, and Sandy Loam.
Elevation, 500 feet above sea level.

Climatological Data for 1937

Mean Annual Temperature, 58.9 degrees Fahrenheit.

Annual Rainfall, 49.91 inches. Total Snowfall, 7 inches.

NEW FEDERAL LABORATORY

The 1938 Congress of the United States appropriated \$80,000. for an office and laboratory building, greenhouses, and garage at the Tobacco Station and plans are now underway for starting this building project. These buildings will be used by workers in the Bureau of Plant Industry and Entomology and Plant Quarantine, as well as by the tobacco specialists in the State work. Congressman Wm. B. Umstead of Durham, N. C., was largely responsible for securing this appropriation.

GENERAL

The primary object of the work of the Tobacco Station is to improve the tobacco crop by better cultural methods, better methods of applying fertilizers, crop rotations, varieties, disease control and better curing methods.

In addition to the work which is being carried on at the Tobacco Station, intensive studies of tobacco diseases are made with particular reference to Granville wilt, root-knot, black shank and black root rot. In order to carry on these four projects, three men are employed for this work, namely; Messrs. James F. Bullock, T. E. Smith, and K. J. Shaw. For this work there has been leased a plot of land consisting of 4 acres in Forsyth County for the study of black shank, approximately $\frac{3}{4}$ acre in Guilford County for the study of black root rot, two plats of land in the southern part of Granville County near Creedmoor, one of 4 acres and another of 8 acres, for the study of Granville wilt, and a plat of land of about 20 acres in Wake County near McCullers Station on the Highway between Raleigh and Fuquay Springs for the study of root-knot.

Progress has been made in the general equipment and buildings of the Station during the past two years. A small experimental barn for the purpose of curing tobacco with electric current was constructed during July of 1937.

RESEARCH

All tobacco research is handled in coöperation with U. S. Department of Agriculture and the N. C. Agricultural Experiment Station.

The general leaders in all tobacco experimental work in the State are Dr. W. W. Garner and E. G. Moss. Dr. R. F. Poole is a joint leader in the tobacco disease projects.

Sources of Nitrogen for Tobacco: A number of sources of nitrogen have been used in crop tests and efforts have been made to measure the relative differences. Soybean meal has been one of the few organic sources which have shown up reasonably well. If and when this product can be bought cheaply enough to be used as a fertilizer, the indications are it will be very satisfactory. While there may not be such marked differences between sources of nitrogen, at the same time it certainly seems worth while to use more than one source of nitrogen for compiling or mixing a tobacco fertilizer.

Sources and amounts of Potash: Several sources of potash have been used during the past few years in experimental work and recently the rate has been more widely varied than heretofore. A series of plats containing from 30 to 300 pounds of K_2O per acre has been used. The results very definitely indicate that considerably more potash could be used than has been done in the past. Both yield and quality have been progressively improved up to around 250 pounds of K_2O per acre with the indication that the curve of improvement would straighten out above that point. Apparently there is not so much difference between the sources of potash provided, however, that too much chlorine is not available. On some soils above 20 pounds of chlorine per acre appeared to injure both quality and yield while on stiffer soils 30 pounds could be used with safety. There are some indications that where high potash is used the sulphur SO_3 trioxide may be increased.

Fertilizer Tests with Calcium, Magnesium, Sulphur and Chlorine: Small amounts of magnesia (20 to 30 lbs. per acre) appear to benefit both yield and quality on the majority of soils even on new land which has just been cleared. Little can be said at present as to the proper amount of sulphur that is necessary for the best result. There are indications that very heavy amounts of SO_3 have a tendency to darken the color of the cured leaf. Just to what extent and where the point of change is not definitely determined. In regard to chlorine, apparently there is no question that large amounts of chlorine influence the burning quality of the cured leaf, and it does injure the growth where

excessive amounts are used. On the other hand, small amounts of chlorine, 20 to 30 pounds per acre, seem to give slightly better texture and larger yields.



TOBACCO BED BEING SPRAYED WITH COPPER OXIDE-OIL-LETHANE MIXTURE.
APRIL 26, 1938. TOBACCO STATION.

Fertilizer Tests in Rotation with Oats, Soybeans and Rye: These tests consisting of 72 plats, one-half of which has previously been limed with a total of 3 tons of ground dolomitic limestone per acre, have been continued since 1911 with changes being made from time to time in the base application of fertilizer. On the limed end of these plats, which has encouraged the growth of wild legumes and other vegetation, plats are beginning to show that too much nitrogen is available for quality tobacco. The indications are the base fertilizer, which has been 800 pounds of a 3-8-6 mixture, will have to be changed reducing the nitrogen and increasing both phosphoric acid and potash. The tobacco on plats which had 18% potash during the 1936-1937 season produced very much better tobacco than where only 6% was used.

Studies of Downy Mildew (Blue Mold of Tobacco): Downy mildew was more severe during the spring of 1937 than any year since 1922. On account of the severity of this disease, we had a better opportunity to make extensive studies on control measures than any time heretofore. A number of sprays and dusts had previously been used and during the past season a splendid

opportunity was offered for testing on a more elaborate scale the most promising ones of those that had been tried. The copper-oxide oil lethane spray was tried in a rather extensive way following up the work which had been done in Georgia and South Carolina. Around 20 plant beds were sprayed with this mixture in coöperation with the growers this year. The results were very satisfactory. In either case there was very little killing of the young plants as compared with a very heavy kill on the unsprayed checks. This material in addition to affording considerable protection to the plants appeared to stimulate the beds and the plants lived and grew off better than the unsprayed. The results obtained in North Carolina were similar to the ones obtained in the Georgia-South Carolina Belt. As a result of these tests it is believed that growers, if they follow carefully the instructions, can secure enough protection to justify the use of this material on their beds.

Considerable progress has also been made in the use of the gas treatment in which benzol is used. It is necessary, however, in



GENERAL LAY-OUT OF TOBACCO SEED BEDS SHOWING PAN, PARADICHLOROBENZENE, AND WICK METHODS OF FUMIGATION TREATMENTS IN THE CONTROL OF BLUE MOLD. APRIL 26, 1938. TOBACCO STATION.

the use of the gas treatment to use a fairly heavy cloth to cover the beds at night and in cloudy weather. The gas treatment appears to be more effective than the spray treatment, but it is more expensive and more cumbersome.

Either of these treatments can be used by the growers and in the long run would be cheaper than late plantings and hauling

plants all over the country. Detailed methods are available for the growers.

Tobacco after Soybeans: The object of this experiment is to see if a proper balance of fertilizer can be used after soybeans turned under to grow quality tobacco. Varying amounts of phosphoric acid and potash with and without sulphur have been used. No commercial nitrogen has been used on a part of these plats. The results up to the present indicate that such a practice could not be recommended only in exceptional cases. The indications also are that it would require three to four times as much potash as is usually recommended in general farm practices.

Sulphur and Chlorine Studies: This test was designed to study in more detail the effect of heavy applications of sulphur trioxide in the form of sulphates on the tobacco. Nothing very outstanding has been secured from these tests so far.

Plant Bed Fertilizer Studies: Comparatively little work has been done on the fertilization of tobacco seed beds. For the past three years different fertilizers have been used in a comparative study on seed beds. The results obtained by the use of all nitrate of soda as a source of nitrogen applied at the time of planting the seed bed have been very satisfactory. The indications are that the nitrogen has leached out before the plant has been able to take it up. There may be some other factor which is at present unknown. Soybean meal has been one of the sources of nitrogen which has given good results. Chlorine in the mixture is not advisable.

Tobacco Curing Experiments: For the past 3 or 4 years limited studies have been made on the methods of curing tobacco. Temperature and humidity records have been kept. Studies on air control and different fuels have been carried on. At the Station an electrically equipped barn was used for the first time, and so far as information is available it is the first barn of flue-cured tobacco to be cured out by the use of electric current to supply the heat. The indications are that tobacco can be successfully cured in this manner, and the temperature can be controlled very efficiently. The major drawback will be the cost of the current. Fuel oil burners were used in another barn, and in another barn a stoker has been used for the three past seasons. These have been compared with the ordinary wood furnaces.

The most efficient in fuel consumption has been the stoker. The six curings during the past season were finished at an average of less than 1100 pounds of coal for each curing. Regular stoker coal was used at a cost of \$7.50 per ton delivered at the Station. This cost can be slightly reduced by buying coal in carload lots.

The oil burners were very satisfactory, but the cost so far has been slightly greater than wood, averaging between \$8.00 and \$9.00 per barn. No definite statement so far can be made with reference to the cost of electric current since there has been no established rate for this purpose. The stoker barn and the electrically equipped barn were thermostatically controlled, which, of course, reduces to a minimum the cost of labor in the curing process. One definite conclusion which has been reached so far is that ventilation is one of the important factors in the curing process. The average wood barn will consume from 1½ to 2 cords of wood for each curing.

Tobacco Insects: The Bureau of Entomology of the United States Department of Agriculture established an office and laboratory in Oxford to study the control methods of tobacco insects July 1, 1935. This office works in coöperation with the Tobacco Station. The Station grew 3½ acres of tobacco in 1936 and 5 acres during 1937 for experimental purposes for this office. One of the major problems has been to develop methods of control for the flea beetles in seed beds and in the field. 1% rotenone dust has been found to be very effective in the control of the insect. Comparative tests have been made this year on the effectiveness of the dust and the spray. Further investigations will be carried on before definite recommendations will be made. Mr. W. A. Shands, who is in charge of this office, and his Assistants are doing a splendid piece of work and as time goes on this office will be in position to make such recommendations as are found to be worth while.

VARIETAL STUDIES OF FLUE-CURED TOBACCO FOR IMPROVEMENT OF QUALITY AND TO DEVELOP DISEASE RESISTANCE

JAMES F. BULLOCK (U. S. D. A.)

Black Root-Rot (Thielavia): Experiments were started in 1929 to find or develop flue-cured varieties of tobacco resistant to black root-rot. These tests are being conducted on the farm of S. E. Boswell, near Summerfield, North Carolina. Special 400 is by far the most resistant variety found. Each year selections are made to maintain resistance. A limited quantity of seed are grown each year for distribution.

Black Shank (Phytophthora nicotianae): Breeding experiments started in 1931 were designed to develop a variety of flue-cured tobacco resistant to black shank. None of the existing flue-cured varieties were resistant enough to be commercially important. No. 301, a hybrid cigar wrapper developed by the North Florida Experiment Station and highly resistant to black

shank, was used in making crosses on five flue-cured varieties. The back cross method of breeding is being used. From experimental evidence and evidence gathered from a number of farmers four or five year rotations are very effective in reducing the loss from black shank.

Soil treatment studies are being conducted by Dr. R. F. Poole of North Carolina State College.

Tobacco Varieties: Tobacco variety tests are conducted to find and develop the best varieties of flue-cured tobacco for the different sections of North Carolina. Breeding methods employed are selection and hybridization. Cash, White Stem Orinoco, Bonanza, Jamaica and Gold Dollar (a selection of Jamaica) are best adapted to the Middle and Old Belts. In the New Belt, Gold Dollar, Virginia Bright Leaf, Bonanza and White Stem Orinoco are most popular.

GRANVILLE WILT

T. E. SMITH (U. S. D. A.)

Extensive experiments designed to develop control measures for Granville wilt (*Bacterium solanacearum* E.F.S.) were started in 1935. Four major lines of work are being followed.

1. *Breeding for resistance:* Strains of tobacco having moderate resistance have been found, but the search is being continued for a higher degree of resistance. The backcross method is being used to introduce the resistance at hand into a standard flue-cured variety.

2. *Host Range Studies:* Certain crop and ornamental plants together with the more common field weeds have been tested for susceptibility to natural infection by growing them on highly infested soil in the field. In all, 77 species have been tested. They varied in susceptibility from 0 to 100%. Four species of weeds—Black nightshade (*Solanum nigrum*), Jimson weed (*Datura stramonium*), Croton (*Croton glandulosus*) and Spanish needles (*Bidens bipinnata*)—were as susceptible as tobacco (100%). Eight species of wilt affected weeds were found in and around cultivated fields of the wilt infested area during the years they were being rotated to immune crops for wilt control. These were Horse nettle (*Solanum carolinense*), Ragweed (*Ambrosia elatior*), Horseweed (*Erigeron canadensis*), Cocklebur (*Xanthium* Sp.), Croton (*Croton glandulosus*), Jimson weed (*Datura stramonium*), Ground cherry (*Physalis pruinosa*) and Aster sp.

3. *Crop rotation:* A five year program of crop rotation experiments is in progress. Bare fallow, soybeans, cowpeas, lespedeza, crotolaria, sorghum, redtop grass, crab grass, sweet pota-

toes, corn and weed fallow are being tested to establish their value when used in separate 2, 3, 4, or 5 year rotations with tobacco. The results from the two year rotations are: Bare fallow and weed fallow—no control; Other crops except corn—moderate control; Corn—best control.

4. *Soil Chemical Treatments*: Carried on in cooperation with Dr. R. F. Poole.

TOBACCO ROOT KNOT

K. J. SHAW (U. S. D. A.)

The principal studies that are now going on at McCullers, North Carolina, on tobacco Root Knot include: (1) Rotation experiments to find out the most practical crops to grow on land that is heavily infested with the Root Knot nematode; (2) Variety studies, including many foreign selections, with the chief object at present to find some variety resistant to Root Knot; (3) Cultural methods, including different methods of applying fertilizer, dates of transplanting and cultivating the growing crop; and (4) Chemical treatments.

(1) Since the rotation experiments were started this year, no actual results were obtained. Starting in 1938, with the two-year rotation, results after different rotations will be obtained for every year thereafter, for a two, three, or a four year rotation.

(2) In the variety studies there were twenty-one selections out of seventy-six tested that showed less than fifty per cent severe root knot, and of this twenty-one, eight had less than twenty-five per cent severe root knot.

(3) In the cultural practices, the ridge method of cultivation was found to be better than flat cultivation. Early and medium transplanting; namely, on May 1 and 15, was found to be far superior to transplanting on May 31. In the methods of applying fertilizer, indications are that mixing the fertilizer in the bottom of the row and applying just before transplanting was the better method during 1937.

(4) In the chemical treatments, which were tried only on a small scale, a considerable reduction in root knot was obtained with mercuric oxide, however, this material caused severe stunting of the tobacco.

BLACKLAND STATION—WENONA, N. C.

J. L. REA, JR., Assistant Director in Charge.

Station Established in 1912.

Area of Station, 362 Acres.

Soil Type, Peat and Muck.

Elevation, 16 feet above sea level.

Climatological Data for 1937

Mean Annual Temperature, 59.5 degrees Fahrenheit.

Annual Rainfall, 49.38 inches.

Total Snowfall, 8 inches.

GENERAL

With the general improvement in agricultural conditions, and the crop control program for the main money crops, interest of a great many people has turned naturally to livestock. Since the program of work on this Station deals largely with livestock and feed crops, farmers interested in this line of work have come to the Station for information on feeding, care and management of livestock, as well as the production of feed crops. We are pleased to report that the Station is being used more and more each year, even though our road facilities are only slightly improved over the past few years. With the promise of an all weather road by our State Highway Commission, it is hoped that this Station will be as accessible and as much used as the other Stations that have had good road facilities.

The program of work on the Station and a brief summary of the results are given below:

RESEARCH

AGRONOMY

Cooperating with the N. C. Experiment Station

C. B. WILLIAMS and E. R. COLLINS

Rock Phosphate, Superphosphate, and Basic Slag Compared as Sources of Phosphoric Acid when Corn, Oats, Soybeans (turned) and Irish Potatoes; Soybeans (turned) are Grown in a Three-year Rotation: The records of this experiment show that all crops in the rotation respond more to potash than they do to either nitrogen or phosphoric acid. The use of phosphoric acid from any of the above sources causes a reduction in yield of the crops. However, basic slag was less injurious to crop growth than the use of the other two phosphatic carriers of phosphoric acid.

In the fall of 1935 an application of 50 pounds of copper sulphate was applied broadcast per acre to half of the three sections of this experiment. During the following spring oats showed a marked response to the copper sulphate application, but the corn and Irish potatoes did not.

A Study of the Rates and Forms of Lime for Corn, with and without Fertilizer: The 1936 yields add further substantiating evidence to findings of previous years that ground dolomitic limestone is a more efficient source of lime for corn grown on muck soil than is either hydrated lime or marl.

A complete fertilizer used in addition to the lime produced a very satisfactory increase in yield, while a complete fertilizer without lime produced less than did the use of lime alone. The

plats which have had no lime are practically barren, due to excess acidity of the soil. Experiment has been terminated.



LIMES TEST—BLACKLAND STATION. LEFT, NO LIME—RIGHT, LIMED.

Fertilizer and Lime Requirements for Corn and Soybeans Grown in Rotation, the Soybeans being Utilized for Seed in one Series and for Hay in the Other: Soybeans were grown on this experiment in 1936. The results secured add further evidence to that already secured that potash is very important and that the best yields were obtained from those plats which had received the higher applications of potash, very low amounts of phosphoric acid, and relatively low amounts of nitrogen.

A Study of Minor Plant Food Elements for Corn on Peat Soil: Forty-one plats are being used for this work with all the minor plant food elements that are known to be essential to plant growth being tried. This work was started in the spring of 1938 and no results have been secured.

A Study of Methods of Establishing Tame Pastures: Eighteen plats are being used with nine of these plats on the old original pasture, and the other nine plats were added after conditioning the soil for two years. The grasses on the last nine plats run across the fertilizer treatments so as to study the effects of the various fertilizers on the different grasses and clovers. Counts are made at definite intervals to determine the density of the grasses, and notes are kept on the growth and ability to stand both wet and dry weather.

Seed Corn Selections: Highland Horsetooth, a white corn and Jarvis' Golden Prolific yellow corn are being field selected for uniformity of type, weevil and corn root rot resistance. These two varieties have been selected for more than ten years, and are showing increased yields.

FORESTRY

In Coöperation with the N. C. Extension Forestry Service

R. W. GRAEBER

One acre of seedling yellow poplar, white ash and cypress were transplanted during the spring of 1938. The growth of these small trees is being watched and the planting will probably be increased with the kind of trees that show the most promise.

LIVESTOCK

In Coöperation with the N. C. Agricultural Experiment Station

EARL H. HOSTETLER and JOHN E. FOSTER

Fish Meal vs. Peanut Oil Meal for Fattening Pigs: Forty 94-pound pigs were used in one feeding trial to compare fish meal and peanut oil meal as supplements to shelled corn and mineral for fattening pigs.

All of the pigs were self fed free choice in dry lots with Group 1 receiving fish meal as its protein supplement and Group 2 receiving peanut oil meal.

Both groups were full fed for 68 days but during that time the pigs on fish meal made an average gain of 96 pounds as compared to 78 pounds for the Group 2 pigs. The latter group also required 15 pounds more feed per cwt. gain than the fish meal group.

Comparative Gains on Reed versus Tame Pasture: In 1937 a repetition of the tests of preceding years was started, but was discontinued on the tame pasture on June 30, due to a drouth.

On April 29, six yearling steers and heifers were turned on the tame pasture. From then until June 30, a 62 day period, they made an average daily gain of 2.2 pounds.

Seventeen similar yearlings were turned on the reed pasture on May 11, and for the 50 day period to June 30, they made an average daily gain of 1.7 pounds.

This has been the approximate results of former years. Although the tame pasture produces more rapid gains during good seasons than the reed pasture, it is much more subject to injury by drouth. For example, in the above case, the reeds continued to furnish fair grazing throughout the season.

One-half of the tame pasture was plowed up in the late fall of 1937 and no cattle are being grazed on tame pasture this year.

Value of Native Reeds (Arundinaria tecta) for Grazing: Native reeds were the chief source of pasture for the beef herd at the Blackland Station, Wenona, from spring to mid-winter.

The cattle were first turned in the reed pasture on May 11, in 1937. On this date, 29 grade Hereford and Native cows and their

25 grade calves, 17 grade yearlings, 17 grade two-year-old heifers, and a Hereford bull, were turned on this pasture. On June 30, six more similar yearlings were turned on the reeds and on July 28 the bull was removed. The calves and 12 yearling steers were taken out on November 17.

From May 11 to November 17, a period of 190 days, the average daily gains for the different groups were as follows: Cows (25 of which were nursing calves), .4 pound; calves, 1.2 pounds; yearlings, .7 pounds; and two-year-olds, .9 pounds. The bull only lost 20 pounds during the breeding season from May 11 to July 28.

In addition, ungrazed reed areas more than maintained the weights of the cows, two-year-olds, and yearling heifers, from November 17 to January 28.

The cows and bred heifers were moved to the farm on January 28 but the winter was mild and the unbred heifers, those born spring of 1936, were left in the reeds all winter. From January 28 to May 6, these two year old heifers made an average daily gain of .6 pound.

All of the cattle were turned back on reed pasture on May 6.



CATTLE BARNS AT THE BLACKLAND STATION.

Value of Crop Gleanings for Wintering Beef Cattle: A. 1937: On January 14, 1937, the seventh year of gleaning studies was started by turning 19 cows and 11 three-year-old heifers into the corn stalk and soybean fields. The cattle were also given access to rye grazing at this time. Sixteen two-year-old heifers were turned into the stalk fields on February 27.

No harvested feed was given these cattle, except two feeds when snow was on the ground, from the time they were turned in the fields until March 30th. During this time the dry cattle made slight gains. The cows with calves, except for loss in weight at calving, practically maintained their weights and produced rapid gains in their nursing calves.

Rye pasture furnished the entire feed for the above group, April 7 to 13.

In addition, the stalk fields and rye pasture furnished the entire roughage (except for a few days when snow was on the ground) for 23 weaned calves from November 30, 1936, to March 11. During this time the addition of only 50 pounds of cottonseed meal per day produced an average daily gain per calf of approximately .6 pound.

Some roughage and grazing was also available throughout the winter which greatly reduced the amounts of harvested feeds required.

B. 1938: In 1938, the cow herd, which consisted of 25 cows and 13 three-year-old heifers, was turned in the corn stalk and soybean fields on January 28. These cattle were also given access to rye grazing at this time, but no harvested feed was fed until April 4. Corn silage and corn stover were fed intermittently, when grazing was not available, from April 4 to May 6, at which time the herd was returned to the summer pasture.

All 38 of these cattle calved (one calf drowned) and, as in former years, except for loss in weight at calving, practically maintained their weights and produced rapid gains in their nursing calves. The combined weight of the cows and their calves on May 6 was 2,425 pounds greater than the weight of the cows (38 head) on January 28. This resulted in an average increase per head of approximately 64 pounds.

In addition, the stalk fields and rye pasture furnished the entire roughage (except for 8 days following weaning) for 20 weaned calves from November 17, 1937, to January 12. Only 50 pounds of cottonseed meal per day in addition were fed during this period but the average daily gains per head were approximately .8 pound.

As in the previous years, some roughage and grazing were also available for the weaned calves throughout the winter which greatly reduced the amounts of harvested feeds required.

Comparative Study of Fattening First Cross versus Second Cross Hereford Yearling Steers: This test was conducted at the Blackland Station from November 19, 1937, to April 13, 1938, covering a period of 145 days. It included 7 first cross steers and 4 second cross steers. All of these yearlings were sired by the same purebred Hereford bull. The first crosses were out of Native Eastern Carolina cows and the second crosses were out of first cross cows, which in turn were out of the same or similar Native cows and by a purebred Hereford bull.

The two groups were fed separately a ration of 2 pounds of cottonseed meal and 5 pounds of soybean hay per head daily, and a full feed of shelled corn and corn stover.

The first cross yearlings averaged 610 pounds when started on feed and made an average daily gain of 2.1 pounds. The second cross yearlings averaged 683 pounds when started on feed and made an average daily gain of 2.3 pounds.

To produce 100 pounds gain the second cross steers consumed 696 pounds of concentrates and 551 pounds of roughage. This was 20 pounds less concentrates and 1 pound less roughage than the first cross steers consumed. Therefore, there was very little difference in the cost of the gains in the two groups.

As feeder and slaughter cattle the second cross yearling steers graded about one-third grade higher than the first cross ones. However, in the carcass both groups graded the same (Top Good) and sold for 15 cents per pound in Baltimore.

A repetition of this trial is to be started in November, 1938.

Comparative Study of Quality of Meat of Yearling versus Two-Year-Old Grade Hereford Steers: This test, which was conducted at the Blackland Station, was a repetition of last year's test. It included 13 yearlings and 9 two-year-olds, all of which were out of Native Eastern Carolina cows and sired by a purebred Hereford bull.

Two pounds of cottonseed meal and 5 pounds of soybean hay per steer daily and a full feed of shelled corn and corn stover were fed, from November 19, 1936 to April 8, 1937, a period of 140 days.

The yearlings, which were started at an average weight of 645 pounds, made an average daily gain of 2.17 pounds. The two-year-olds, which were started at 830 pounds, made an average daily gain of 2.06 pounds.

To produce 100 pounds gain the yearlings consumed 687 pounds of concentrates and 556 pounds of roughage, or 176 pounds less concentrates and 53 pounds less roughage than the two-year-olds. This resulted in \$2.84 per cwt. cheaper gains for the yearlings.

For the two trials combined the yearlings made more economical gains in the feed lots and were more profitable than the two-year-olds.

The comparison closed with this trial.

Improvement of the Family Cow by the Use of a Purebred Guernsey Bull: The Station continues to maintain a purebred bull for community service. The quality of the milk cows has been increased until it is possible to sell cows from this com-

munity at a premium due to their improved breeding and milk production.

Work Stock Improvement: The Station is now producing its own work stock and a surplus for the other Stations. Six mares and a registered Percheron stallion are being kept. The stallion is used in the team for farm work, to breed the Station mares and any outside mares that are brought in. This project seems to be very popular among farmers that are interested in producing their own horses. Each year the number of outside mares that are bred has increased.

Farm Flock of Sheep: A flock of around twenty purebred Hampshire ewes and one ram are being kept. Cost of maintenance, weights of fleece, and returns on lambs, are being recorded. The increase above replacements are being sold for breeding purposes to farmers at a reasonable price.

Mineral Supplement for Sheep: The flock has been divided equally into two groups, with one group receiving a mineral mixture of steam bone meal, limestone, copper sulphate and iron sulphate. The other group receive only salt as their mineral. The object of the experiment is to determine if there is any advantage in supplying a mineral mixture to sheep that are being grazed on organic soils. The experiment has been running for a period of one year, and so far there has not been any noticeable difference.

Improvements:

1. The purchase of a McCormick-Deering husker and shredder.
2. Purchase of a McCormick-Deering ensilage cutter.
3. Completion of hog farrowing barn and outside pens.
4. Stallion and colt paddocks have been built.
5. Fences in front of dwellings have been rebuilt and changed so as to keep all stock away from the dwellings.
6. A telephone line has been constructed from Plymouth to the Station by the E. C. W., with the Station furnishing the poles, telephones, and connections.

PIEDMONT STATION—STATESVILLE, N. C.

J. W. HENDRICKS, Assistant Director in Charge and
Agent, U. S. D. A.

Station Established in 1903.

Area of Station, 237 Acres (State) Soil Type, Cecil Clay Loam.
133 Acres (Federal).

Elevation, 950 feet above sea level.

Climatological Data for 1937

Mean Annual Temperature, 59. degrees Fahrenheit.

Annual Rainfall, 50.41 inches. Total Snowfall, 13.5 inches.

GENERAL

During the past two years the greatest addition to this Station in the way of improvements was the purchase of thirty acres of land adjoining the Station on the west. This land is very desirable from the standpoint of location and its value for experimental purposes. We have added about forty acres to our pasture, and while this would not be classed as experimental work, we have an excellent herd of Jersey cattle for the purpose of supplying milk for the employees on the Station. We also keep a purebred bull for general service in the community.

The 1937 Annual Farmer's Field Day was attended by approximately 3,000 people. In addition, we have held Small Grain Field Days with an attendance of more than 300. The attendance, together with the increased number of visitors throughout the year, will give some idea as to how the Station's activities are appreciated by the public. We have an average of some 500 visitors each month coming as individuals and in groups up to 150.

RESEARCH

The following will give the program of work and a brief progress report on the experiments under way:

LIVESTOCK

In Coöperation with the N. C. Experiment Station

EARL H. HOSTETLER and JOHN E. FOSTER

1. *A Study of Pastures and Their Utilization by Sheep (Co-operating with R. E. Stitt, Forage Crops, U. S. D. A.):* This study for the fiscal year 1936-37 comparing the three four-acre fields, was conducted as in the two preceding years with the following two exceptions: Korean Lespedeza was sown with both the rye and rye grass, no Kobe Lespedeza being sown. Fields 2 and 3 were divided equally in the fall of 1936 and one-half of each sown to rye and the other half to rye grass.

A. 1937: In 1937 grazing was started on the rye and rye grass areas on February 15, and on the permanent pasture on April 1.

The permanent pasture (Group 1) was grazed continuously from April 1 to November 4, a period of 217 days, with an approximate average of 10 ewes per day. In addition, about 13 lambs were grazed on this area until June 24.

The areas of lespedeza and rye (Group 2) were grazed as follows: Rye from February 15 to May 10 (except for 4 days when snow was on the ground); lespedeza from June 24 to September

23, and rye from October 21 to November 18. This was a total of 199 days with an average of approximately 10 ewes. There were also about 13 lambs from February 15 to April 1 and 6 from June 24 to August 26.

Lespedeza and rye grass (Group 3) furnished grazing as follows: Rye grass from February 15 to May 10 (except for 4 days due to snow), lespedeza from July 15 to August 26, and from September 9 to November 24. This gave a total of 198 days with an average of approximately 12 ewes per day. In addition, there was an average of approximately 13 lambs grazing on these areas until May 10.

Some roughage was fed in all fields during bad weather, and a grain mixture was fed to the lambs and nursing ewes.

Considerable grazing was still available in the lespedeza fields when they were plowed for fall seeding of rye and rye grass. It was again very difficult to get a good stand of lespedeza in the rye grass due to the sod.

The sheep and lambs in all three fields received ample grazing while in these fields and again there was no significant difference in the gains while all fields were being grazed. Each group remained in very satisfactory condition. However, during the winter season when the permanent pasture was not being grazed, the groups on rye and rye grass made considerable larger gains, and required much less hay than the permanent pasture group, which was on dry feed.

B. 1938: Group 2 was returned to the rye pasture on February 25, 1938. It was alternated on the two rye areas, at from one to two week intervals, from then until May 4. By that time the rye grazing was over and the sheep were removed to the farm flock to allow the lespedeza in the rye to get a start. During this 68 day period from February 25 to May 4, the rye furnished continuous grazing for from 9 to 10 ewes and from 12 to 13 lambs.

Group 3 was returned to the rye grass pasture on March 11, 1938. It was alternated on the two rye areas at one week intervals from March 11 to May 20, with the exception of one week from April 22 to 29. During this time the sheep were moved to the farm flock because the next (alternate) rye grass area was not yet ready for grazing. By May 20 the rye grazing was over and the group was removed to the farm flock in order for the lespedeza in the rye grass to get a start. From March 11 to May 20 the rye grass furnished 63 days grazing for from 9 to 10 ewes and from 12 to 13 lambs.

Group 1, consisting of 9 ewes and 11 lambs, was started on permanent pasture on March 25, 1938. (At this time one ewe and her lamb were moved from Groups 2 and 3 so that all three groups

would have 9 ewes to the group.) From March 25 to the last weigh day, May 20, the permanent pasture has furnished 56 days grazing.

The lambs in all three groups had access to a grain mixture in creeps and the ewes received 1.5 pounds of a grain mixture per head daily, but no roughage was fed when the groups were on pasture, after February 25.

The ewes and their lambs in all three groups received ample grazing while on pasture and the lambs made excellent gains. Again the comparative results were approximately the same as those given in the summary of 1937 results.

Drenching Lambs for Stomach Worms: The drenching of sheep with nicotine sulphate solution has proved to be satisfactory practice in the control of stomach worms.

Changes in Meat and Wool Characteristics: A study of weights, measurements, and photographs of the improvements in the quality and quantity of meat and wool of sheep. Discontinued.

Breeding Stock: The Station furnishes ewes and purebred Hampshire rams as breeding stock when available, at reasonable prices.

The Family Sow: This project is to determine the cost of maintaining three purebred sows and one purebred boar and their offsprings under general farm conditions. Breeding stock is sold to farmers of the section.

AGRONOMY

Coöperating with the N. C. Agricultural Experiment Station

C. B. WILLIAMS, Head Department Agronomy

Fertilizer and Lime Requirements for Cotton, Corn, Wheat, and Red Clover When Grown in Rotation on This Type of Soil (W. H. Rankin): The main objectives of this experiment are as follows:

1. To determine the nitrogen, phosphoric acid and potash deficiencies of this soil type.
2. The proper proportions of nitrogen, phosphoric acid and potash that should be used for leading field crops.
3. To determine best quality of fertilizer to use per acre.
4. To study the symptoms of any nutrient deficiencies that may develop.

It has been found that when applied singly, phosphoric acid is the most important nutrient to be supplied for production of cotton, corn, wheat, and red clover, with nitrogen ranking second in importance, and potash the least important as far as yield is

concerned. However, for the control of potash deficiency ("rust") of cotton and frenching corn, potash is of primary importance to be added.

From observation on the cotton crop and corn crop on Field A, it is evident that potash deficiency of cotton is most severe in its damage where higher percentages of superphosphate are applied in the fertilizer mixture, or where it is used in large amounts. Results secured show that an application of one ton of limestone once in the rotation accentuates the potash deficiency of cotton symptoms, lowers the quality of the fibre and seed of the cotton.

For the production of red clover on this soil is not only essential to be added but liberal quantities of available phosphoric acid and potash.

Studies of the Efficiency of Superphosphate and Rock Phosphate as Source of Phosphoric Acid on Cecil Clay Loam Soil (W. H. Rankin): When equal amounts of phosphoric acid are applied from superphosphate and rock phosphate, the superphosphate produces larger yields than rock phosphate. With the increasing quantities of rock phosphate applied the severity of potash deficiency symptoms and damage has been found to increase. This observation is evident on both the limed and unlimed series of plats, it being as in other cases always more pronounced on the limed series.

A Study of the Yield and Quality of Crops when Wheat and Corn are Each Grown Continuously on the Land (W. H. Rankin): The most outstanding difference is between continuous corn without lime and a three-year rotation of corn, wheat, and red clover with lime applied once in a rotation. The average yield of corn per acre where corn has been grown continuously with a complete fertilizer is 19.3 bushels, while the average yield of corn per acre in a three-year rotation of corn, wheat, and red clover is 37.3 bushels.

Cotton Improvements (P. H. Kime): The Mexican Big Boll variety is the principal variety grown at this Station. Pure line selection work is carried on each year, and high yielding strains of uniform staple have been developed, which are well adapted to the conditions under which they are grown. Last spring this Station distributed to growers 200 bushels of registered Mexican Big Boll Cotton Seed, Strain 128-6.

Cotton Varieties (P. H. Kime): This project is to make a study of cotton varieties and strains with reference to new types that may be introduced from time to time.

Corn Breeding (G. K. Middleton): To produce and maintain a high standard of Weekley's Improved, which has been leading

in our variety work for a period of fifteen years. The Station has been distributing approximately 100 bushels of registered seed corn per year.

Corn Varieties (G. K. Middleton): To determine the best varieties adapted to this locality, the following table shows the results of our work for the past twelve years:

<i>Variety</i>	<i>Acre Yield</i>
Weekley's	40.1
Jarvis' Golden	38.8
Latham's	37.5
Southern Beauty	37.0

Small Grain Breeding (G. K. Middleton): The production of varieties of small grain crops including wheat, oats, rye, and barley which are superior in yield, adaptability and disease resistance is the object of this small grain work.



"SMALL GRAIN DAY"—PIEDMONT STATION. FARMERS LOOKING OVER SMALL GRAIN PLATS.



GRAIN HARVEST—PIEDMONT STATION, BY USE OF A COMBINE.

Registered and Certified Seed: The Station produces annually approximately 1,200 bushels of registered and certified seeds. The demand for quality seed is increasing from year to year.

Wheat Variety Tests (G. K. Middleton): Over a period of fifteen years we find the following varieties leading:

<i>Variety</i>	<i>Acre Yield</i>
Fulcaster	30.3
Leaps	30.0
Gleason	29.8
Purple Straw	29.6

Oat Varieties (G. K. Middleton): The Lee variety has proved to be the best winter oat for fall seeding in the Piedmont area of the State. It is more resistant to winter injury than any known variety. Over a period of fifteen years, it has been our highest yielder.

Barley Selections and Varieties (G. K. Middleton): To develop more reliable types of barley with reference to yield, disease resistance, and other favorable characteristics adapted to Piedmont North Carolina. We find the bearded varieties give us our best yields, while the objectionable feature is the harvesting and thrashing. The two outstanding varieties grown in this State are North Carolina Bearded, which is badly mixed, and Tennessee No. 6, a smooth barley which is comparatively pure. These varieties are both susceptible to smut diseases. The Station has developed two distinct types of bearded barley and has made one selection from Tennessee 6. These three selections are showing quite an increase in yield over other barleys being grown in this section and are practically resistant to smut. We are increasing this selection as fast as possible and this year have grown approximately 700 bushels for distribution.

Head Selection (Barley) (G. K. Middleton): To develop more desirable types of barley, and to compare under uniform conditions those best adapted to Piedmont North Carolina as to yield and other desirable characteristics.

Rye Varieties: To determine the outstanding varieties adapted to this and other sections of North Carolina: Abruzzi gives us our best yield with but very little difference in Abruzzi and Balbo with reference to pastures, perhaps a slight advantage in favor of the latter, but in strength of straw, the Balbo is very weak and is susceptible to lodging. The Station produces approximately 200 bushels of registered Abruzzi seed for sale each year.

Rust Resistance Studies with Small Grains (G. K. Middleton): To obtain strains of varieties of small grains which are suitable to North Carolina. Also to determine varieties which are more

resistant to leaf and stem rust than the varieties which are now commonly grown.

Pasture Fertilizer Tests: To determine the best fertilizer for pastures in Piedmont North Carolina and the time of applying same. Our study reveals that nitrogen is our limiting factor, however, in making a good pasture one should not overlook the value of lime and phosphate.

FORAGE CROPS

*Coöperating with the Office of Forage Crops, U. S. D. A., and
The N. C. Agricultural Experiment Station*
R. E. STITT, U. S. D. A.

Alfalfa Strain Tests: Yields were not recorded on first cutting because of the draught which lowered the first cutting to less than 800 pounds. The first cutting was harvested on May 25, the second on July 15, and the third on August 26.

Trifolium Procumbens: *Trifolium procumbens* makes the strongest growth under conditions existing in closely grazed pasture as shown by tests in closely clipped grass, long grass and on bare soil. Germination on natural seeded areas occurred during the periods when the surface of the soil was moist during September, October, and November.

Soybean Improvement Investigations: Out of 453 introductions of soybeans studied for hay yielding characters, 12 have been selected for further testing.

Date of Harvest Studies with Annual Lespedeza: For maximum hay yield, Korean lespedeza should be harvested between August 25 and September 15 and Kobe between September 10 and October 1. Both the Korean and Kobe varieties, if harvested for



MAKING ALFALFA HAY--PIEDMONT STATION

hay during late August or early September, will produce enough seed on the aftermath for securing volunteer stands.

Lespedeza Sericea versus Alfalfa: *Lespedeza sericea* grown in comparison with alfalfa under similar treatment yield 30 per cent more than alfalfa for one year and 50 per cent more as a three-year average. The three-year average was 4509 pounds of sericea and 2964 pounds of oven dry hay per acre.

Grass Cultural and Production Investigations: The following grass experiments are being studied: 1. Adaptation studies with new and introduced species; 2. Studies on the longevity of different legumes in Kentucky bluegrass; 3. A study of grass mixtures for pastures; 4. A study of cereals for grazing during early fall and spring.

COTTON BREEDING STATION

In Coöperation with the U. S. Department of Agriculture

Under a Public Works allotment of \$56,000 to provide land, buildings, and other facilities for investigational work on cotton, a Federal Station was established in 1936, adjoining the Piedmont Experiment Station at Statesville, N. C. Work at this Station is coöperative with the State Department of Agriculture, the State Experiment Station and other State Agricultural Agencies, with the object of improving the status of cotton production through (1) developing better cultural practices, (2) producing varieties superior in yield and quality and more resistant to diseases and other factors adversely influencing production, (3) studying the diseases of cotton and determining methods for their control, (4) determining the underlying principles concerned in the production of quality cotton and its improvement, and (5) developing and applying methods for utilizing and maintaining quality seed stocks, particularly through single-variety communities. These investigations are a part of a National program of improvements in production and quality American cotton.

Fundamental to such a program is a more thorough study of existing varieties from broad cotton belt standpoint. It is necessary to make a more complete inventory of the present cottons before the most intelligent sort of production is set up for further improvement. Varieties are now being studied with the view of determining the influence of soil, region, season, and the kind of variety on yields, useful factors and quality of fibre as measured by field performance, ease of picking, ginning tests, technical measurements of fibre properties, spinning tests, etc.

FORESTRY

Forestry Variety Work: To determine the best variety of pines in this section. In this experiment we are studying the value of forestry in connection with soil building and soil erosion prevention. This experiment is only eleven years old, however, we are observing outstanding results, and we are thinning for proper stand.

HORTICULTURE

Coöperating with the N. C. Agricultural Experiment Station

M. E. GARDNER, Head, Department of Horticulture

Peach Fertilization: This is the fifth bearing year for this orchard. From data received, the following observations are made:

1. There was practically no difference in total yield between treatments of unfertilized vetch cover crop plus nitrogen applied to the trees and unfertilized vetch alone. These were the two highest yielding plats.

2. N. P. K. applied to the trees under clean culture conditions ranked third in total yield.

3. Vetch cover top dressed with 200 pounds of a 4-12-2 fertilizer plus P. K. applied to trees gave the highest percentage of desirable fruit grades.

Measurements were made on 100 terminal branches from each plat, and the number of fruit heads determined.

Raspberry Fertilization: These plants have been bearing for three years. Harvesting began June 12 and continued into July. In addition to yield data, leaf counts were made and number, length, and circumference of canes recorded. In connection with leaf counts, comparison was made between sprayed and unsprayed plants.

It is found that by adding one or two more Bordeaux sprays to the schedule, fungus diseases may be largely controlled.

Two red seedlings, U. S. D. A. No. 9 and N. C. R. 30, planted at Statesville in March, 1935, showed greater resistance to foliage diseases than Latham.

Fruit Variety Studies: This test has been continued with peaches, cherries, grapes, apples and small fruits to determine varieties best suited to Piedmont conditions.

COASTAL PLAIN STATION—WILLARD, N. C.

CHAS. DEARING, Assistant Director in Charge and
Associate Horticulturist, U. S. D. A.

Station Established in 1905.

Area of Station, 445 Acres. Soil Type, Norfolk Fine Sandy Loam.
Elevation, 51 feet above sea level.

Climatological Data for 1937

Mean Annual Temperature, 62.8 degrees Fahrenheit.
Annual Rainfall, 43.90 inches. Total Snowfall, 2.6 inches.

PUBLIC RELATIONS

This Station continues to serve as a center of agricultural activity in the southeastern section of the State. The Annual Field Day has been continued during the biennium period. Two very successful Field Days were held with attendance on both years of between eight and ten thousand people. In 1936, the Field Day marked the twentieth anniversary of this event, and the Field Day of 1937 was notable because of the presence of Governor Hoey as principal speaker and the first Field Day at this Station attended by Hon. W. Kerr Scott as Commissioner of Agriculture. During the biennium, two special Strawberry Days have been held in the interest of the strawberry growers of the section, and two stock judging days have been held in the interest of the Young Future Farmers of America organization. These are the outstanding public occasions, but many other similar gatherings of farmers, scientists, and other visitors have been held from time to time in connection with various subjects. In coöperation with the Wallace Strawberry Festival, a breakfast was served in honor of Mrs. Franklin D. Roosevelt on the occasion of her visit to the Festival. At this breakfast were featured new fruits developed at the Station.

IMPROVEMENTS

The outstanding improvement made during this biennium has been the purchase of a 129 acre farm adjoining the Station on the South as a dairy plant for use in developing a more comprehensive project in the interest of the dairy industry of the section. At the present time, efforts are being expended on the development of this area, on establishing coöperative relations with the Government, and on the erection of necessary modern dairy buildings. A \$39,000. WPA project has been approved for adding modern dairy buildings and equipment. \$400.00 was also expended in repairs to various poultry buildings. The road system of the Station has been put in better shape. Approximately two acres of new land have been brought under culture.

RESEARCH

The principal lines of work at the Coastal Plain Station relate to agronomy, horticulture, livestock, and poultry. On account of limited area for the production of feed stuffs, this Station does not attempt to carry extensive projects along many lines of livestock production. The two principal activities are dairy work and poultry work, but the Station also maintains some hogs.

DAIRY

Coöperating with the N. C. Agricultural Experiment Station

C. D. GRINNELLS

The Station herd was started in 1910. Three superior sires have been proven out as recorded in the last biennial report. During the present biennium, the Station had been attempting to prove out a fourth sire, and simultaneously increase the production of the herd. This sire is Oxfordia's Lad of Morrocroft, purchased from Hon. Cameron Morrison of Charlotte, N. C. The progeny from this sire are now coming into production and are a prominent part of the present herd. They are all particularly good type and indications are that their records will surpass the previous records of the herd. All the animals in this registered Jersey herd have been produced at the Station. Through a process of elimination the entire present herd is descended from two of the three principal cows which the Station has produced,—all of these three cows have life time records of over one hundred thousand pounds of milk testing over five percent butterfat. One of the three cows was sent to the Mountain Station, the other two are still in the herd along with their progeny.

In addition to line breeding work and using the herd as a source of good dairy stock, accredited as free from both tuberculosis and bangs disease, the herd has been used during the biennium for studies relating to temporary pastures and year



COASTAL PLAIN STATION, WILLARD, N. C.

around grazing. In these studies, the use of soybeans as a temporary summer pasture to supplement permanent grass pastures and afford needed succulent feed at times when the permanent pastures suffer under drought conditions has been fully demonstrated. The Biloxi variety of soybeans has given best results. Being a late maturing variety, it permits four periods of grazing on the same beans during the summer. In the winter time the comparisons have been made between Italian rye grass, Abruzzi rye and winter oats. Italian rye grass has furnished the most grazing days. As the biennium comes to a close, plans are being developed for more extensive work of this nature. Coöperative arrangements are being worked out with the Dairy Bureau of the U. S. Department of Agriculture and the 129 acre farm recently purchased is being prepared for the use of the dairy. Plans and specifications have been drawn up for a new dairy barn, new calf barn with maternity stalls, a new milk house and silos, and it is planned to turn the present dairy barn into an auditorium for farmers' meetings.

POULTRY

Coöperating with the N. C. Agricultural Experiment Station
R. S. DEARSTYNE and C. O. BOLLINGER

Two bulletins have been issued during the biennium reporting on research work with poultry at this Station. Station bulletin 304,—“The Influence of Certain Protein Levels on the Growth of Poultry” summarizes protein level research to date. As a result of this work at this Station and also at the Mountain Test Farm, the protein level in the state open formula growing mash was lowered from 17.5 percent protein to 15 percent protein. This represented a reduction in price per ton of poultry feed of approximately \$5.60. It is safe to say that the saving to poultry raisers from the use of this new formula represents many times the total money allocated for poultry research over the last five years.

Technical bulletin 55, issued in April, 1938, entitled, “Summary of Facts of Feeding Yeast Fermented Mash to Laying Pullets” related to research work which has attracted attention throughout the United States. Conducted jointly at the Central Plant at Raleigh and at the Coastal Plain Station, this project has brought many inquiries. By feeding yeast fermented mash in addition to a basal ration, egg production was increased from 140 eggs per bird per year to 150 eggs per bird per year. Mortality differences were not significant, but the yeast fed birds came into production earlier than the control birds and maintained higher production throughout the test. Other results from this work may be found in the bulletin.

A more recent line of research, one which is not yet completed, has to do with the study of peanut meal as a poultry feed. Peanut meal is being used to replace certain animal protein concentrates more generally used with a view to determining to what extent this native North Carolina protein feed might be used as a substitute for the animal proteins. While the project has not been carried to completion, results indicate that peanut meal may be used to replace a certain percent of animal protein concentrates without materially interfering with production, hatchability, or livability of the progeny up to ten weeks of age. It is hoped that this project will open an outlet for some of our native peanut meal and in this way directly affect the prosperity of the people of the state.

The Station is also doing pedigree work with a view to development toward poultry flock improvement, and a new project has been prepared which has as its purpose to develop by pedigree work, propogation and dissemination of superior families of poultry having a high transmissible livability. The Coastal Plain Station flock has for years served as a source of foundation stock known to be healthy. It is planned now to develop by breeding work stock not only of superior health, but also high production.

Some needs of the poultry project at present are as follows:

1. A suitable incubator house, using the present small building for Poultryman's office.
2. At least one electric starter battery of five compartments and suitable room for housing this.
3. Several Lyon electric chick brooders, 500 capacity.
4. A plant of several acres for developing birds and four new range shelters.
5. One new laying house with 1200 square feet of floor space suitably equipped with metallic trapnests, automatic waterers and metallic feeders.

SWINE

The Station has continued its two sow and boar hog project, it being the policy not to increase the hog work at this Station beyond this point on account of the presence of large dairy and poultry projects. The work, however, continues to furnish a recognized source for the purchase of high grade breeding stock in the territory. This steady breeding of pedigreed swine into the territory has been a major factor in the general improvement of swine stock in southeastern North Carolina.

SHEEP

During the biennium the sheep project was closed out. It was found that with limited grazing area in this part of the state, it

was very difficult at best to control parasitic worms. Since the project was not yielding favorable results, it seemed best to bring it to a close in order that the public would not be misled. The remaining stock was transferred to the Upper Coastal Plain Station and sold off to private growers.

AGRONOMY

*Coöperating with the U. S. Department of Agriculture and
The N. C. Agricultural Experiment Station*

E. R. COLLINS, R. L. LOVGORN and L. G. WILLIS

The forage crop nursery consisting of acid tolerant legumes has been continued and new tests have been made comparing over a hundred strains of alfalfa with a view to determining the best adapted strains for use under the climate and soil conditions of southeastern North Carolina. Alfalfa has not been as successful in this part of North Carolina as it is in other sections. It is believed, however, that seeking for the best adapted types; along with other tests in coöperation with the Soil Fertility Specialists at State College, which appear to be opening up new information on the proper fertilizing of alfalfa on this type of soil; promises to develop information which will permit successful alfalfa culture. This would mark distinct progress for dairying and other types of animal husbandry in this section. Especial attention is being given to the effects produced by applying minor elements to the normal fertilizer mixture when preparing land for alfalfa.

The project relating to crotalaria as a soil improving crop has been continued during the period.

Some four hundred varieties of soybeans have been tested out from the standpoint of their adaptability. These have included all the edible types as well as the field crop types. The Station has also multiplied seed stock of the Rokusun soybean, which is the edible variety that has done best, and has introduced this variety to the farmers of the state. A considerable demand for it has developed from the food products manufacturers and those farmers who have followed up the Station's introduction are now in position to dispose of all possible seed they can produce at a profitable price.

The work with *Lespedeza sericea* has been continued, this legume being tested both for hay and for grazing. The Station has continued to get two good cuttings of *Lespedeza sericea* hay per year.

HORTICULTURE

*Coöperating with the U. S. Department of Agriculture and
The N. C. Agricultural Experiment Station*

GEORGE M. DARROW (U. S. D. A.), M. E. GARDNER, E. B. MORROW,
C. F. WILLIAMS, and ROBERT SCHMIDT.

Muscadine Grapes: Following the repeal of the prohibition laws, there has been a decided increase in Muscadine grape plantings through the State during the biennial period. The Station has served as a source of information to farmers establishing these commercial vineyards and has also continued to produce commercial unfermented muscadine grape juice. In breeding work with the muscadine grapes, a number of promising seedlings have been selected and have been propagated preparatory to establishing a new variety test vineyard which will be planted this winter. To the extent possible under drought conditions which have prevailed, the Station has propagated the standard varieties. There has been a wide margin of difference between successful propagation from cuttings under field conditions during the two drought summers of 1936 and '37 and the wet summer of 1938. These decidedly contrasting seasonal conditions along with the propagation work under way have given a clear demonstration of the need of maintaining continuous and ample soil moisture in order to successfully propagate cuttings in the field.

Blueberries: A planting of blueberry seedlings of the "Rabbit-eye" type which is native to the sand hills of North Florida, has come into heavy fruiting during the period, and, although conditions in the summers of 1936 and '37 were exceedingly dry, this species of blueberry has thrived on high sandy ground with applications of sawdust as a mulch and soil acidifier and moderate fertilization with cotton seed meal. While this type of berry is not as commercially important as the "Sampson Blues" type native in North Carolina; it, nevertheless, seems to offer considerable possibilities as a late type for home plantings throughout southeastern North Carolina. The fruit is produced very abundantly, but is not of as good quality and does not have the commercial possibilities of the other type owing to the fact that its ripening date conflicts with the ripening date of the earlier type farther north. It is planned to make selections among the seedlings and multiply the most promising ones for introduction as a new fruit to fill a gap in the succession of home fruits extending from strawberries in the early spring to Muscadine grapes in the fall. While this late type is not of as high quality, it, nevertheless, is of excellent quality for the making of pies and blueberry sauce in the home.

Bulbs: Bulb work at the Station has been curtailed during the biennium period, but has been continued through plantings on the farms of the commercial bulb growers where fertilizer studies have been conducted. Present plans call for the establishment of plantings this fall to test the possibilities of lily culture.

Brambles: Plant breeding work with the brambles (blackberries, dewberries, and raspberries) has been very greatly developed during the period. Approximately an acre and a half of seedlings representing first generation crosses between the Japanese trailing raspberry and the northern commercial sorts have been tested out, and in the spring of 1938 a new planting of about two acres of raspberry seedlings have been set out.

A commercial test of the Japanese trailing raspberry has been conducted with a view to trying to determine which of the selections previously made are the best commercial types. Six selections have been made from these plantings and will be continued and further tested. This project has permitted the introduction of this new fruit on to the local market of the section. Commercial tests have also been made with the Youngberry and Boysenberry, two new dewberries which have been made available to North Carolina farmers through this Station. While both of these new fruits have succeeded, the Boysenberry has been somewhat of a disappointment owing to its being later, more acid and somewhat coarser than the Youngberry. Studies have also been made having to do with the quick freezing of the various brambles under test. The Youngberry has proved to be one of the best adapted fruits for commercial quick freezing on the basis of the quality of the project. While this very delicious home berry is too juicy and heavy for normal commercial shipment, it can be shipped while frozen and the frozen fruit can be used successfully for making jellies and marmalades.

Strawberries: One of the outstanding projects of the Station during the past biennium has been the strawberry research work. This work has commanded the attention of strawberry growers in the section to the extent that some of the leading growers have become regular weekly visitors to the Station during the strawberry season, and they are also following the work with more or less close attention through the rest of the year. Studies have been made of many cultural problems. It has been demonstrated that strong plants resulting from establishment early in the growing season will give higher yields the following spring than comparative but smaller plants established late in the season. Comparative studies have also been made of various cultural systems such as the single hill row, the double hill row, the triple

hill or spaced row, and the matted row. In general the matted row which was formerly used by the growers has proven inferior to the other systems which permit a better spacing of individual



VIEW OF THE STRAWBERRY FIELD OF COASTAL PLAIN STATION, SHOWING SECTION WHERE CULTURAL PROBLEMS ARE BEING STUDIED.



A GOOD TEAM OF STRAWBERRIES FOR EASTERN NORTH CAROLINA GROWERS. BLAKEMORE, THE LEADING COMMERCIAL VARIETY AND SELECTION No. 112, A LATER SORT.

plants in the row. By giving plants plenty of space they are enabled to protect themselves better under drought conditions and make stronger growth, which, in turn, gives higher yield per plant. Highest yields have resulted from the triple hill row, but the quality of fruit under comparable conditions is a little better in the double hill and single hill rows.

In the breeding work hundreds of seedlings have been tested each year and the few most promising have been selected and multiplied so that a fifty foot row test of the selection could be made. These fifty foot row tests have been carefully studied and eliminations have been made as defects have shown up. Gradually by a process of elimination the outstanding selections have been located and these have been multiplied and tested in larger commercial plantings. The most outstanding selections at the present time listed under their selection numbers are the 112, 333, 337, 419, 613, 640, and 669. The Blakemore, which was introduced from the Station, has gradually increased in importance and popularity during the biennium, and each year on the cash auction market at Wallace has sold at a premium over Missionary, on some days the differential being as much as \$1.00 per crate. This has meant cash returns to the farmers, who were previously growing the Missionary variety, many times more than the total cost of these investigations. The variety has now spread to the point where it is being grown all over the United States as well as here in North Carolina, and it is undoubtedly one of the most generally adaptable of all strawberry varieties. At the present time, it is planned to formally introduce the 337, 419, and 669 during the coming winter. Under commercial test the 112 has proven to be a particularly fine variety for planting as a companion variety with the Blakemore. It proved to be one of the best from the standpoint of production, percentage marketable berries, and condition of fruit on arrival in New York when shipped in refrigerated trucks and iced cars. The 640 is exceptionally promising as a table variety, as a variety for early forcing, and for quick freezing with a view to supplying the ice cream trade. The 613 is exceptionally vigorous, very large, of highest quality and appearance, and exceedingly firm. It appears, however, to be a late variety, whereas the commercial needs of this section appear to call for early varieties. It will, however, undoubtedly prove a valuable late commercial sort to supplement the Blakemore.

Another line of strawberry research which has been carried forward during the biennium period is the irrigation work. This has demonstrated that by irrigation during drought periods in the fruiting season, the quality and yield of fruit can be much improved. Irrigation through the growing period in drought years also appears to give favorable results, but it has not yet been demonstrated that these results are sufficiently good to warrant the costs involved.

Studies of strawberry diseases, especially the leaf spot and leaf scorch have given results which the growers have at once acted upon. By spraying with Bordeaux mixture, it has been demon-

strated that these two diseases can be controlled, and in controlling the leaf spot disease the fruit is made more attractive. It has been clearly demonstrated that the dead caps of "black caps" so often noted on fruit coming to market are the results



CRATE OF FANCY STRAWBERRIES FROM COASTAL PLAIN STATION. THIS TYPE OF CRATE WAS FIRST USED IN EASTERN NORTH CAROLINA BY THIS STATION.

of the leaf spot disease, and when spraying for this disease on the foliage one also controls it and prevents it from attacking the caps of the berries. Spraying demonstrations have been conducted not only at the Station, but in the commercial fields of growers in the section, and the growers have recognized the benefits resulting from these spraying demonstrations. Other strawberry plantings at the Station have been used for studies relating to the soil acidity problem in relation to strawberry culture, but such studies have not yet reached the point where conclusions would be warranted. The Station has also conducted demonstrations in commercial strawberry culture, packing and marketing and has introduced a new type of crate into the section which is being looked upon with more favor as a crate for use in shipping fancy fruit for the fresh fruit market.

Sweet Potatoes: Under this project continued selections for type and yield of N. C. Strain No. 1 Porto Rico Sweet potato is being made in order to maintain the strain as a source of registered seed. A number of new seedling sweet potatoes obtained

from the U. S. Department of Agriculture are being grown for observation.

Cabbage: A five year experiment with fertilizers for early cabbage has just been completed. A report of the results was read at the 1938 meeting of the Association of Southern Agricultural Workers.

Pecan Breeding: Out of approximately one thousand seedling trees, a very promising seedling has been selected as being worthy of distribution. Propagation by budding on nursery stock was begun last year.

Twenty-two year's yield records have been taken on a number of trees of our more important varieties.

UPPER COASTAL PLAIN STATION—ROCKY MOUNT, N. C.

R. E. CURRIN, JR., Assistant Director in Charge and
Agent, U. S. D. A.

Station Established in 1902.

Area of Station, 449 Acres.

Soil Types, Marboro, Rustan,
Dunbar, Coxville with Norfolk
Series predominating.

Elevation, 100 feet above sea level.

Climatological Data for 1937

Mean Annual Temperature, 61.1 degrees Fahrenheit.

Annual Rainfall, 44.24 inches.

Total Snowfall, 1.5 inches.

GENERAL

This Station continues to serve as a center for agricultural research for the Upper Coastal Plain region of the State. The principal lines of work deal with tobacco, cotton, peanuts, corn and soybeans.

With the purchase of 248 acres of land adjoining the old Station property, a much enlarged program of research was started in the spring of 1938. This new land is especially well suited for plat work. All of the old agronomy experiments have either been concluded or revised and moved to the new farm, and many new experiments have been started, particularly with peanuts.

AGRONOMY

The tobacco experiments are handled in coöperation with the Office of Tobacco Investigations, U. S. Department of Agriculture

W. W. GARNER, E. G. MOSS, and J. P. YOUNG

Tobacco Variety Test: Most of the leading varieties of tobacco have been tested and the Virginia Bright Leaf and Gold Dollar seem best suited to this section. We are making selections from these varieties and have developed several strains which

show improvement over the original varieties. Our selected seed are very much in demand in this section. Selection No. 400 developed at the Tobacco Station looks very promising and seems to develop well in this section.

Split Application of Fertilizer for Tobacco: This series of plats was begun in 1931 to determine the effect of fractional application of fertilizer on the yield and quality of tobacco. On the heavier soil types the split applications have been detrimental in some instances. On lighter soil types an additional application of nitrogen and potash gives increased yields, especially after heavy rainfall during the transplanting period. Where more than fifty pounds per acre of K_2O is applied, the additional potash should be applied to the side on account of the trouble in securing a stand. All side applications should be applied early. Discontinued, January, 1938.

Sources of Potash Test: This work was begun in 1927 to determine the best source or sources of potash for tobacco. 1000 pounds per acre of a 3-8-5 was used. A mixture containing one-half Muriate and one-half sulphate of Potash Magnesia gave the best results. Discontinued, January, 1938.

Lime, Sulphur, Chlorine and Magnesia Test for Tobacco: This series of plats was begun in 1932. The need for Magnesia was very apparent on the no Magnesia plats. We did not get the bad results expected from heavy amounts of Sulphur. All the tobacco work has been moved over to the land purchased recently and all the fertilizer work has been changed.

Disease and Insect Study of Tobacco: A five acre field was planted in 1936 and 1937 to study control of nematodes. This work discontinued for 1938. We have started two new series of fertilizer experiments: first, to study the proper ratio of Sulphur and Potash for quality and yield of tobacco; second, to study amounts and sources of Phosphorus for tobacco.

Cotton Breeding with Special Reference to Meeting the Needs of Manufacturers of the State (P. H. Kime): This work was started in 1917 and has consisted principally of line selection with the Mexican variety. A large number of plant-to-row progenies are grown each year. The more promising of these go into the strain test the next year, where further elimination takes place. The more outstanding strains are continued in the strain and variety tests and also grown in increase blocks. Strains considered worthy of distribution are multiplied on the Station farm and distributed to growers. Desirable characters considered in the breeding work are good yields, earliness, medium growth, 1 to 1/16 inch staple of uniform length and high spinning quality,

large bolls, high lint percentage, storm resistance, seedling vigor and other factors.



THE MEXICAN BIG BOLL VARIETY OF COTTON WAS DEVELOPED AND INTRODUCED FROM THE UPPER COASTAL PLAIN STATION

The most outstanding strains distributed from this Station during the past have been Mexican, strains 18, 18-7, 87 and 87-8. These have compared favorably with other commercial varieties in variety tests in the state.

Up to 1936 very little hybridization had been done as a means of developing new types for commercial production. During the season of 1938 about 100 double crosses involving approximately forty different combinations are being grown.

Utilization of the Whole Plant for Cellulose (P. H. Kime): The effect of culture methods and rates of application of fertilizers on the yields of seed cotton and total plant growth is being studied.

Cotton Work Begun in 1938 (P. H. Kime): Variety test work was resumed in 1938. Sixteen varieties were included in the test. These represent the leading varieties grown in the southeastern states and a few from the Delta region.

Utilization of Crops by Two Different Methods (Earl H. Hostetler and E. R. Collins): In this final year's work on this project all three plats were planted to cotton. The yields of seed cotton during the progress of this experiment were (1):—

Year	Plat 1	Plat 2	Plat 3
1928	562 lbs.	565 lbs.	456 lbs.
1931	1272 lbs.	1612 lbs.	1262 lbs.
1934	874 lbs.	1209 lbs.	910 lbs.
1937	1307 lbs.	1618 lbs.	1208 lbs.

(1) Plat 1—All crops harvested.

Plat 2—Fertilized as Plat 1, edible crops "hogged off".

Plat 3—Amount of fertilizer reduced, edible crops "hogged off".

The following agronomy experiments have been concluded and the results will be published:

(1) *Fertilizer and Lime Requirements for Corn and Soybeans Grown in Rotation, the Soybeans Being Utilized for Seed Production in One Series and for Hay Production in Another* (E. R. Collins): This experiment was conducted to determine the best fertilizer for corn, soybeans (for seed); and soybeans (for hay); and to show the effect upon succeeding crops of corn where the soybeans are picked for seed versus cutting them for hay. Consistently much higher yields of corn have been obtained where the soybeans were picked for seed than where they were harvested for hay.

(2) *Study of Yields and Quality of Succeeding Crops When Cotton, Corn, Small Grain and Peanuts are Grown Continuously and When they are Combined in Two, Three and Four-Year Rotations* (E. R. Collins): This experiment was inaugurated in 1924 and was a study of the yields and quality of succeeding crops and their effect upon the fertility of the soil when cotton, corn, peanuts and small grain are grown continuously and when they are combined in two, three and four-year rotations.

(3) *A Study of The Influence of Certain Dusts and Sprays Upon the Growth, Yield, and General Characteristics of Peanuts*: This test has been combined with the new experiments under peanut disease control studies.

New Agronomy Experiments Started in Spring of 1938: (1) Nutrition of peanuts and cotton grown in rotation with soil building and feed crops; using the fertilizer plots for developing and evaluating rapid chemical methods for determining nutritional requirements of the soil. (E. R. Collins and N. E. Rigler (J. J. Skinner coöperating in the cotton investigations)).

(2) Peanut breeding, spacing and variety studies. (G. K. Middleton and P. H. Harvey).

(3) The improvement of corn varieties, including tests of hybrids and top crosses. (G. K. Middleton and P. H. Harvey).

(4) Cotton fertilizer studies. (L. G. Willis).

(5) Minor plant food tests with peanuts. (E. R. Collins).

Seedling Diseases and Seed Treatment (S. G. Lehman): In seed treatment studies with cotton treatment with New Improved Ceresan at rates varying from $\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2% oz. of dust per bushel of seed and with Ceresan at 2, 3, and 4 oz. per bushel of seed gave statistically significant increases in number of hills per row, number of seedlings per row, and average number of plants per hill for all rates of application when planted in Norfolk sandy loam at this Station. The percentage increase in number of seedlings emerged ranged from 46 per cent to 157%. In general New Improved Ceresan was somewhat more effective in improvement of stands than Ceresan when the comparisons are made on the basis of equivalent units of active ingredients in the dust mixture applied.

Peanut Disease Control Studies (R. F. Poole): This work was started in the spring of 1938 and consists of chemical treatments and the study of rotations in relation to the control of diseases. These tests are being carried on at this Station and on the leased areas in Northampton, Halifax, and Perquimans Counties.

HORTICULTURE

Pecan Orchard Management: To compare the effect of clean culture, sod culture and a cover crop system on the yield of pecans:

The crops for the past two years were small and showed no significant differences between the treatments. Previous results indicate that in a dry season yields are apt to be better in cultivated rather than in sod orchards. This experiment is inactive at the present time.

Sweet Potato Storage: This work has been continued and additional information has been secured on the value of the Government type of a sweet potato storage house.

Certified Porto Rico seed potatoes are available to growers at a reasonable price.

LIVESTOCK

Coöperating with the N. C. Agricultural Experiment Station

J. E. FOSTER

Sheep: A small flock of sheep is kept at this Station and information is secured on methods of handling sheep under general farm conditions.

Hogs: The purpose of this project is to secure cost records on carrying over brood stock and to supply the pigs for the crop utilization project outlined under agronomy.

MOUNTAIN STATION—SWANNANOVA, N. C.

S. C. CLAPP, Assistant Director in Charge

Station Established in 1908.

Area of Station, 316 Acres. Soil Types, Toxaway and Ashe Clay Loam.
Elevation, 2,250 feet above sea level.

Climatological Data for 1937

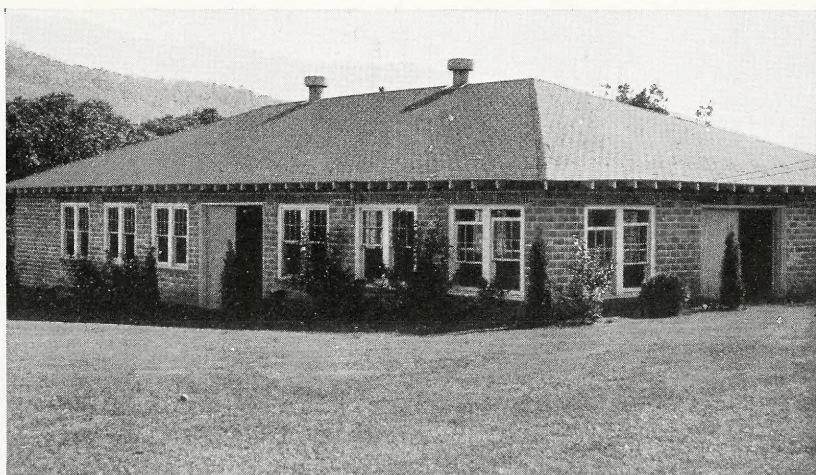
Mean Annual Temperature, 55.6 degrees Fahrenheit.
Annual Rainfall, 49.39 inches. Total Snowfall, 8.5 inches.

THE 4-H CLUB CAMP

The 4-H Club Camp, located on the Station farm, is proving valuable and popular to the Club members in Western North Carolina. Each week during the summer a different County group of boys and girls attend the Camp for a period of study and recreation. The groups are under the leadership of their County and Home Agents. A study of the experimental work on the Station is a part of the course of study for the different county clubs attending the camp. The attendance is approximately 1,000 people each year.

PUBLIC RELATIONS

The Station auditorium is proving to be a community center for meetings of farmers and civic organizations. The principal meeting of the year in this building is in connection with the Annual Farmers' Field Day, which is held on the third Thursday in August. The average attendance at these meetings is approxi-



AUDITORIUM—MOUNTAIN STATION. A COMMUNITY CENTER FOR MEETINGS OF FARMERS AND CIVIC ORGANIZATIONS.

mately 2,500 farmers and others interested in agricultural development of the region.

The work of the Station continues to grow in popularity as is evidenced by the increasing number of visitors each year seeking information on various agricultural subjects. It is estimated that we have an average of 500 visitors each month.

IMPROVEMENTS

The farm poultry house has been converted into a granary and a story has been added, which provides three rooms and a bath for station workers.

The office building has been remodeled and a heating plant installed.

A new metal silo has been added at the dairy barn for experimental work with different kinds of ensilage.

Approximately one mile of farm road has been graded and improved, leading to the 4-H Club Camp.

Improvements are now being made to curb the Swannanoa River at a point where it overflows on the Station lands.

RESEARCH

The following experimental projects are being conducted with the view of meeting the increased demands for information on better methods of farming in the Mountain region.

POULTRY

Coöperating with the N. C. Agricultural Experiment Station

R. S. DEARSTYNE and H. D. SMITH

The main features of the poultry projects for the years 1936 to 1938 have been the combination of the breeding and pedigreeing of the breeding flocks, lighting of one laying house, and comparing brooding developments of chicks in brick and electric brooders. Results indicate that development is rapid in the electric brooder for the first ten days, but after this time development is more satisfactory with brick brooders.

With the coming of Rural Electrification, a demand for information on artificial lighting for commercial egg production was evident. A project was started two years ago with two pens of S. C. White Leghorns of equal breeding and environment where lights were used on one pen while none was used on the other one. The lights are used to regulate the working day of the hen and increased two hours each year to find what length of time is necessary for best production, and some promising results are indicated.

AGRONOMY

Coöperating with the N. C. Agricultural Experiment Station
C. B. WILLIAMS, Head, Agronomy Department

Two special experiments with 40% T. V. A. phosphate and rotation of corn, wheat, soybeans, and despedeza were started two years ago. Some promising results are seen so far, and especially so where soybeans are returned to the land in comparison to taking them off the land.

Fertilizer Requirements for Corn, Wheat and Soybeans When Grown in a Three-year Rotation on Toxaway Loam (Field A) (W. H. Rankin): The yield records of wheat from this experiment in 1936 add further evidence to previous findings; i.e., more economical yields of crops have been produced from the use of a complete fertilizer, with lime once in the rotation, than from single elements or combinations of two elements.

Comparative Value of Rock Phosphate, Superphosphate, Soft Phosphate, and Basic Slag as Sources of Phosphoric Acid When Used on Toxaway Loam for Corn, Wheat and Soybeans Grown in Rotation (W. H. Rankin): Superphosphate has been found to be the most efficient source of phosphoric acid in this experiment; i.e., where lime is applied once in the rotation, where no lime is applied, and where stable manure is used as the source of nitrogen.

A Study of Different Fertilizer Treatments and Methods of Utilizing the Legumes When Grown in a Three-year Rotation on Porters Loam (Field B) (W. H. Rankin): In this experiment where one crop of corn, one soybean crop, one wheat crop and one lespedeza crop has been grown the indications are thus far that if all the legume crops are removed, as has been done on half of each plat, the yields of all crops are reduced. If, on the other hand, all the legumes, both soybeans and lespedeza, are returned to the soil after growth, the yields of corn and wheat are increased, provided all crops receive complete fertilizers. On the plats that have not received complete fertilizers, the yields of corn and wheat are not being maintained.

Hybrid Corn (G. K. Middleton): In the spring of 1938, 95 hybrid corns were planted. This test has created considerable interest although no definite results have been obtained so far.

Winter Hardiness of Small Grains (G. K. Middleton): For the past two years a number of varieties have been grown for a study of cold resistance. This work is handled in coöperation with the U. S. Department of Agriculture.

Lespedeza Varieties: Four varieties of lespedeza have been planted in the main apple orchard for soil building and to study

adaptation of varieties. The Korean seems best suited for this section.

Continuous Corn and Crimson Clover: This has been the outstanding soil building test in the Station's program. A ten-acre field has been planted annually to corn and crimson clover for the past twenty-eight years. The clover is planted in the corn at the rate of fifteen pounds per acre at the time of the last cultivation. The clover is plowed under around the first of the following May, and the land planted back in corn. At the beginning of the test the land produced eighteen bushels of corn per acre, and at the close of the twenty-eight year period, the production was fifty bushels per acre.

HORTICULTURE

Coöperating with the N. C. Agricultural Experiment Station

M. E. GARDNER and E. B. MORROW

Fruit Variety Studies: This work has been continued as in the past, and additional information has been secured.

(a) *Apples:* The study of varieties and hybrids of apples are being conducted and information secured indicates that Bonum, Delicious, Grimes Golden, Staymen, Winesap, and Rome Beauty are the better fall and winter varieties for this section. Rome Beauty and Winesap have better keeping qualities than the others.

A number of summer hybrid apples are now bearing and U. S. D. A. hybrids No. 1 and No. 15, Melba, Gallia Beauty, Keetosh, and Staymared are most promising.

(b) *Grapes:* Seventy-two varieties of grapes are now bearing at the Station where yield, hardiness, quality, and disease resistance are taken into consideration for best kinds which indicate the following: Concord, Niagara, Lutie, Delaware, Herbert, Green Mountain, Ontario, and Portland as best varieties for the Mountain section.

(c) *Raspberries:* Eight varieties are under observation for yields, quality, and general health, and indications are that Latham is the leading variety for planting in this section.

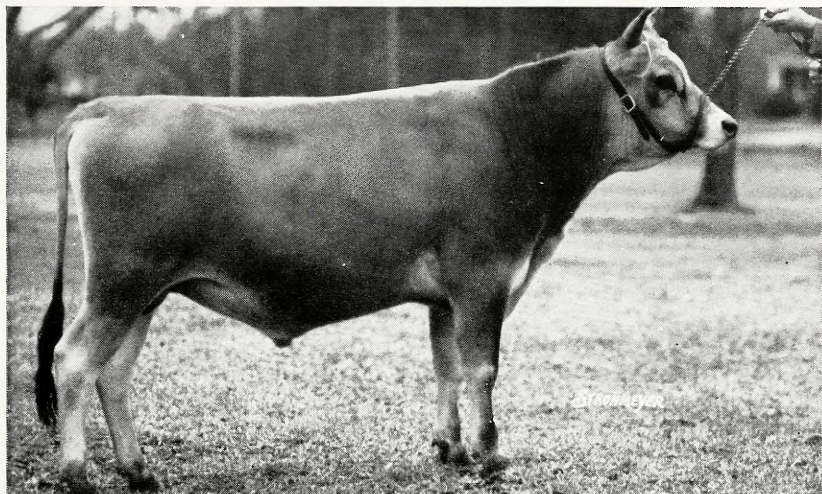
(d) *Cherries:* Montmorency and Early Richmond are leaders of sour varieties of variety studies of cherries, and Schmidt and Napoleon are the leaders of the sweet varieties.

(e) *Dewberries:* Lucretia continues to be the leading variety for this Section.

(f) *Strawberries:* Variety studies are continued and spacing, double and single row tests are now being conducted in

coöperation with the N. C. Experiment Station. Premier, Dorsett, and Fairfax are now leaders when yields, quality, and disease resistance are considered.

The spacing records have not been conducted long enough for a report on results.



OXFORDIA LAD OF MORROWCROFT, 364447. A LINE BRED SYBIL BULL—BEING PROVEN AT THE MOUNTAIN AND COASTAL PLAIN STATIONS.

Apple Pruning: This experiment has been going since 1919 and present results indicate a modified leader, medium pruning, and thirty-six inch headed trees. This work is done with four leading varieties of apples, and it may vary slightly with some other varieties.

Vegetables: A year-round vegetable garden largely for observation is maintained for studies of varieties, dates of planting, cultural practices and insect control.

DAIRYING

Coöperating with the N. C. Agricultural Experiment Station
C. D. GRINNELLS

Dairy Cattle Pasture Studies 111: The 1937 data give the results of the seventh year of this study of intensive fertilization. Plat 4 which has not been fertilized for two years, is continuing to improve. This plant was heavily infested with ground moles which have almost been eradicated by trapping.

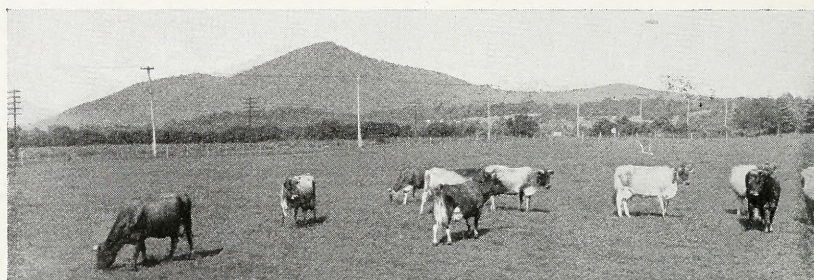
The net yield expressed in total digestible nutrients per acre for 1937 is as follows:

	Plat 1	Plat 2	Plat 3	Plat 4	Plat 5
Total digestible nutrients per A. (1937)	2629	2654	1844	1617	2159

The fertilizer applications per A. for the above plats are as follows:

Superphosphate	300	300	300	0	300
Nitrate of Soda	160	260	0	0	360
Muriate of Potash.....	50	100	50	0	50

All plats show an increase in yield over that of the previous year.



JERSEY HERD—PASTURE STUDIES III—MOUNTAIN STATION.

The Economy of Feeding Beet Pulp, Mountain Station: This study is to determine the advisability of buying beet pulp for a commercial dairy herd when an ample supply of good corn silage is available.

The first feeding trial has been completed and no advantage was obtained by the addition of beet pulp. When on the beet pulp ration there was a slight decrease in silage consumption, but the unit cost of product in milk or butterfat was high.

Herd Development: The management of the dairy herd follows the plans advised for the better commercial dairies of the State. The herd is enrolled in the Herd Test of the American Jersey Cattle Club, and all animals are in test continuously.

Many good individual and herd averages have been made.

SWINE

The Family Sow: A small herd of Berkshire hogs is kept at this Station, and information is secured on the cost of raising pigs. Breeding stock is also sold to farmers of the section at a reasonable price.

FORESTRY

In 1934 three acres of land were planted in four varieties of pines for the purpose of forestry demonstration, and to secure cost data on growing timber.

Timber areas on the Station have been properly thinned as an example of the proper methods in forestry management.

VETERINARY DIVISION

DR. WM. MOORE

Bang's Disease: Bang's disease, also referred to as infectious abortion, bovine infectious abortion, contagious abortion, abortion disease, etc., is a transmissible disease, due to a specific organism or germ affecting animals but causing the greatest loss and damage to cattle. This is a very versatile organism; in addition to causing most abortions in cows, it causes many weak calves to be born, most of which die later. It is the cause of considerable breeding trouble, retention of afterbirth, temporary and permanent sterility, and a great loss in milk production. This disease affects hogs but we have not found it very prevalent in hogs in this state, although we have made a great many tests. This disease also affects man and is known as undulant fever, being transmitted to man by contact with infected animals and through the drinking of milk from infected animals.

A large amount of work directed toward the control and eradication of this disease has been done during the period covered by this report. The greater part of this was done by the Federal Government with A.A.A. funds which were made available for blood testing and paying indemnity on reacting animals, an amount not to exceed \$25.00 for grades and \$50.00 for pure bred animals being paid. This is based on the difference between the appraised value and the salvage, the owner receiving the amount obtained for the salvage. Coöperation on this project is based on the State furnishing the laboratory facilities and a part of the laboratory help; the expense of obtaining samples and indemnity being paid from the A.A.A. funds. During this period there were 255,825 cattle tested, of which number 5,770 reacted, indicating that they were affected with Bang's disease. Indemnity in the amount of \$140,264.45 was paid. Operating expenses of the Federal Government during this period amounted to \$43,944.36. This work was inaugurated July 1, 1934. From that time to July 1, 1938 there was a total of 387,250 cattle tested, of which number 13,597 reacted. During the first three years that this work was carried on, tests were made in practically all counties of the state, as it was our desire to eradicate this disease from the pure bred herds and from the commercial dairy herds, and at the same time to acquaint cattle owners in all sections of the state with the importance of this disease.

In addition to the above, we have also tested all of the State owned herds and the herds of charitable institutions and at this time I am very glad to report that we have been able to eradicate this disease from these herds.

While the promiscuous testing of cattle throughout the state proved to be satisfactory, it was found to be rather expensive when the cost was figured on a per head basis and in 1937 we decided that sufficient work of this kind had been done and that we were ready to do this work under the area plan—that is, the testing of all cattle in a county, as was done in the case of bovine tuberculosis. The 1937 Legislature enacted a law providing for this work and authorizing the County Commissioners to co-operate with us. During the period covered by this report, the following counties adopted this work, six of them being completed:

Cabarrus started July 1, 1937; completed February 28, 1938.
Wayne started July 16, 1937; completed February 15, 1938.
Yadkin started July 20, 1937; completed March 21, 1938.
Davie started December 6, 1937; completed May 7, 1938.
Rowan started July 20, 1937; completed June 30, 1938.
Forsyth started August 23, 1937; completed June 30, 1938.

Davidson started March 1, 1938.
Durham started April 25, 1938.
Iredell started May 9, 1938.
Lincoln started June 16, 1938.
Gaston started June 16, 1938.

Mecklenburg started June 16, 1937.
Union started July 16, 1937.
Guilford started September 7, 1937.
Haywood started December 6, 1937.
Catawba started February 16, 1938.

The following counties have adopted the work and testing will begin just as soon as we have veterinarians available:

Anson	Gates	Moore
Beaufort	Granville	Orange
Bladen	Johnston	Stanley
Buncombe	Macon	Surry
Clay	McDowell	Wake

We hope to continue this work as rapidly as possible, eventually taking in all counties and eliminating this disease from the entire state.

As referred to above, this work, on the part of the Federal Government, has been done with A.A.A. funds. However, the last Congress, in making appropriations for the fiscal year 1938-'39, provided that these funds would come from the general fund and not from the A.A.A. They also provided that beginning July 1, 1938 that indemnity would be paid on the basis of one-third of the difference between the appraised value and the salvage, not to exceed \$25.00 for grades and \$50.00 for pure bred animals, instead of the *difference* between the appraised value and the salvage, and with the further provision that on and after May 1, 1939 no indemnity will be paid except in the case where the State pays, and not to exceed the amount paid by the State. Therefore, this means that on and after May 1, 1939, unless we have a State appropriation with which to pay indem-

nity, an owner of an animal affected with Bang's disease will not be paid any indemnity.

As stated above, the indemnity paid by the Federal Government during the two years covered by this report amounted to a little more than \$140,000, or about \$70,000 per year. With the increased amount of testing arranged for, we believe that it will require an appropriation of about \$40,000 annually by the State to take care of indemnities for the next biennium and I respectfully request that this amount be appropriated.

BOVINE TUBERCULOSIS

Work in the eradication of this disease has been confined to the testing in counties in which the three year accreditation period has expired, State owned herds, herds of charitable institutions, herds to which imported cattle have been added, and herds known to be infected. During the period covered by this report, we have tested 63,153 cattle, ten of which were classed as reactors and slaughtered. A number of these did not show visible lesions and the others showed only slight lesions. We can, therefore, say that this disease has been practically eliminated from the cattle of this state. All of the diseased animals referred to were slaughtered and the owners were paid an indemnity of one-third of the difference between the appraised value and the salvage, not to exceed \$25.00 for grades and \$50.00 for pure breeds, and a like amount was paid by the Federal Government.

Numerous requests for testing are received which we are not able to take care of. We consider this a purely personal service and, in many instances, the cost of testing would be greater than the value of the animals tested. Such testing can be done by local veterinarians at much less cost than the expense to us.

CATTLE FEVER TICK

No cattle fever ticks have been found during the period covered by this report, notwithstanding the fact that we have made a very large number of inspections in all sections of the state. No cattle fever ticks have been found since 1929, at which time we had a small outbreak in Sampson County.

HOG CHOLERA AND OTHER SWINE DISEASES

The prevalence of hog cholera during the period covered by this report has been about the same as similar periods, although there has been considerable increase in other swine diseases. During the summer of 1936 there were approximately 10,000 hogs brought into this state from the drought area of the West,

principally from Nebraska, and placed in some twenty or twenty-five counties in this state. As a result of this movement, avian tuberculosis, swine erysipelas, and other infectious diseases and parasites which we did not previously have in this state, were introduced.

Hog cholera continues to be the most important disease of swine in this state, despite the fact that the cause and the methods of prevention have been well known for more than twenty-five years. I am convinced that cholera will never be controlled by the promiscuous use of serum and virus, as has been practiced in the past twenty years. We have an abundance of evidence to show that much serum and virus is needlessly used by untrained men, not only resulting in the waste of money but also starting real outbreaks of cholera. Notwithstanding this, recent sessions of the Legislature have, by special acts, granted permission to individuals, untrained and unqualified, to use serum and virus promiscuously. We can never hope to control cholera so long as this continues. We have demonstrated that cholera can be controlled more satisfactorily by proper veterinary investigation and inspection, following out a system of swine sanitation, quarantine, etc., at much less cost than the cost alone for serum and virus used promiscuously by untrained men. In my opinion, hog cholera will never be satisfactorily controlled until we adopt a general policy throughout the state of restricting the use of virus, quarantining diseased animals, and handling this disease with a trained personnel just as other diseases have been properly handled in the past. To complicate this situation, there are a number of other infectious diseases now affecting hogs, which makes it more important that these be handled by a trained personnel. Internal parasites of swine, of which there are many, are causing an enormous loss and are making it increasingly difficult to raise pigs. In a proper plan of hog cholera control, parasites and other diseases would be taken care of.

Beginning July 1, 1938, we have secured the services of four veterinarians who will be stationed at central points in the east where the greatest number of hogs are raised and where the greatest amount of loss is suffered from disease. While it will not be possible to cover this territory thoroughly with four men, yet we believe that a good start towards the controlling of swine diseases can be made.

PULLORUM DISEASE

A satisfactory program of blood testing poultry flocks for the elimination of pullorum disease was carried on during the two seasons covered by this report. The rapid stained antigen test has been used with very satisfactory results. During the 1936-37

season, we made 285,490 tests and during the 1937-38 season we made 333,824 tests, removing in the first season 7,932 birds and in the other season 8,868 diseased birds. These diseased birds, along with the culls, were marked and removed immediately from the flocks and sold for slaughter. This work is very popular with the more than one thousand flock owners for whom we test, and hatcherymen have found that without this testing work, it is impossible to produce a satisfactory chick. With this test, when supported with strict sanitation and proper brooding of chicks on the part of the flock owner, pullorum disease can be controlled almost 100 per cent, but without this coöperation, the testing will merely hold the infection to a lower per cent.

RABIES

The general operation of the State Rabies Law, Chapter 122, Public Laws 1935, so far as the Department was concerned, was placed in this Division early in 1935 and has been continued. This is another dog law that does not seem to be very well observed. During the 1935 season, sixty-two counties made some effort to comply with the law but only in a small number of these were the greater part of the dogs vaccinated. We distributed that season 63,370 doses of vaccine and with that purchased from other sources, I estimate that about 100,000 dogs were vaccinated. This represents probably less than 25% of the dog population of the state. During the 1936 season there were about thirty-six counties that made some effort to comply with the law. Only a small number of these vaccinated near all of the dogs in the respective counties. We distributed 50,000 doses of vaccine during the season and with vaccine purchased from other sources, I estimate that there were about 75,000 dogs vaccinated. In 1937 we distributed 10,000 doses of vaccine and in 1938, 8,550. There were about seventeen counties that coöperated during 1937 and about ten in 1938, which shows a gradual falling off in the use of vaccine. Estimates on the number of dogs in the state run from 200,000 to 1,000,000. I think it is safe to assume that there are at least 500,000 dogs in the state. We estimate that there were 100,000 dogs vaccinated in 1935; 75,000 in 1936; 25,000 in 1937; and perhaps 15,000 to 20,000 in 1938. Taking the highest number in any year, 100,000 in 1935, there would be only about 20% of the dog population vaccinated in widely scattered areas and this certainly could not be responsible for any great reduction in rabies even though we assume that the vaccine is highly efficient.

The present rabies law has been studied and commented on by a great many persons qualified to do so, but I know of no one who might be classed as an authority, who has endorsed this law or

who believes that it will accomplish the purpose for which it was intended. I think that the present law has been given a fair trial and found inadequate and that a new law should be enacted, giving the County Health Officers or the County Board of Health full authority to carry out such control measures as they may deem necessary, as is the law in other public health matters. The law should be short and explicit so as not to be misunderstood and the County Board of Health should be given authority to make regulations to carry out the details.

One of the most important things in the control of rabies is the elimination of the stray and worthless dogs. This is difficult of accomplishment and seems impossible under the present law. I doubt the advisability of State-wide vaccination but believe that such vaccination should be confined to areas where the disease is known to exist. By referring to the records of the State Laboratory of Hygiene, we find that for the five years, 1932-'36 inclusive, that there were six counties in the state during this five year period that did not report a case of rabies. There were five other counties with only one positive case each during the period and eleven counties with five or less during the five year period. We certainly could not justify the expense and trouble of vaccinating the dogs in these twenty-two counties, nor could we justify it from a disease control standpoint. A quarantine on all dogs, properly enforced, together with vaccination instituted by the County Health Unit under a law such as I have suggested, would, in my opinion, properly take care of the situation in these twenty-two counties and I believe it would do the same in any county with less expense, confusion, and criticism than attempting a state-wide program of vaccination. Dog laws are always difficult of enforcement and it seems unreasonable to expect a sheriff of a county upon whom falls the enforcement of the present act, to enforce such a law when he must frequently run for reelection.

I hope that the present law will be satisfactorily amended by the next General Assembly.

SHIPMENTS EMERGENCY RELIEF CATTLE

Although all of the more than 100,000 cattle which were shipped into the state from the Western drought area were disposed of in 1934 and 1935, we still receive many complaints of cattle diseases which, it is believed, were introduced by these cattle. We have had some cattle scabies in our native cattle, contracted from these drought relief cattle but we have eliminated all of this except in two herds. We have also found a very large number of less important skin diseases resulting from the introduction of these cattle. There has been a large number of cases of infec-

tious keratitis, an acute disease affecting the eyes and often resulting in blindness. I wish to repeat that this cattle program was a costly experiment, the expense of same being greatly in excess of the value of the meat obtained. One cannot estimate the future cost by reason of the spread of previously unknown diseases in this state to our native cattle, but I believe that it will be quite large.

PUBLIC LIVESTOCK AUCTION MARKETS

During the past two or three years there have sprung up in all parts of the state public livestock auction markets, there now being about twenty-five of these. At these markets a public auction sale is held one day of each week and all classes of animals are brought in for sale not only by farmers but by livestock dealers and peddlers. The most of these markets are the outgrowth of a former horse and mule sale stable. Such markets perform a useful service in that they offer a market to the farmer who has only a small number of animals to sell which it is not possible for him to ship to a market; but on the other hand, they are a real problem in animal disease control for the reason that many diseased animals are offered for sale and sold at these markets. The Board of Agriculture recognized this problem some time ago and in March, 1938 they adopted regulations setting up certain restrictions regarding the selling of animals with a view to preventing the spread of animal diseases. These regulations have helped the situation to some extent but through lack of legal authority and of personnel, it has been found impossible to properly enforce them.

The unrestricted movement of livestock by truck, often by irresponsible peddlers who sell the livestock to farmers, results in the spread of animal diseases. I would recommend that the Board of Agriculture be given explicit authority to regulate these markets, not only in connection with disease control, but as to the entire operation of them. At present, any one who desires may set up one of these markets, with no assurance that the farmer will be dealt with fairly or that he will even receive his money for an animal which is sold. I think that the Board of Agriculture should also be authorized to regulate the movement of livestock by truck.

EQUINE ENCEPHALOMYELITIS

This is a specific disease affecting horses and mules and has probably existed in this state for a number of years, causing in some years very serious losses in some sections and being known under the names of blind staggers, forage poisoning, etc. It has

recently been found that this is a virus disease and experimental work seems to indicate that it is transmitted by mosquitoes and perhaps other biting insects. There was some loss during the summer of 1937 and it would seem that the loss during 1938 may be somewhat in excess of 1937.

There are two types of this disease known as the Eastern and the Western. So far, we have only encountered the former but since there are many horses and mules shipped from the West, it is reasonable to expect that we may have to contend with both types. A severe outbreak of this disease occurred in the West in 1937 involving more than 100,000 horses, and the present outbreak in that section indicates that there will be a larger number this year. Satisfactory methods for the control of this disease have not been worked out, although there has been perfected a vaccine and a serum which seems to be of value.

MISCELLANEOUS

We have had a very large number of requests to investigate reports of outbreaks of disease. It has not been possible for us to take care of all of this on account of the greatly increased amount of laboratory and other work and a lack of personnel. Many of these requests for assistance are for a purely personal service that could be taken care of at less expense and entirely satisfactorily by the local practicing veterinarian. This presents one of the most unpleasant problems with which this Division has to deal. Many livestock owners apparently believe that the State should supply them free and prompt veterinary service for all occasions. This, of course, is impossible and, I think, undesirable. We have followed the policy of investigating, so far as time and funds will permit, those reports that indicate that a serious contagious disease exists that, without help, might spread and seriously affect the livestock industry, and investigation is also made when a large number of animals are affected and the cause cannot be determined. I am glad to report that no anthrax, sheep scabies, black leg, or glanders have been encountered during the period covered by this report, although these diseases have previously existed in this state and we are constantly on the lookout for them.

We have continued to look after the health of livestock on the twenty-two State owned farms and the farms of the State Highway and Public Works Commission and have made considerable effort, with success, to prevent disease among the livestock.

We have continued to look after the health of the livestock on the prison farms and have found it necessary to keep all of their hogs vaccinated. Practically all of the prison camps have more

or less farm land and on nearly all of them hogs are produced. Since all of these camps feed garbage from the prison kitchen, which is a prolific source of hog cholera, we believe that it is essential that these hogs be immunized against cholera. We have therefore inaugurated a systematic plan of vaccinating all of the hogs at these camps and all of the pigs that are farrowed.

DAIRY DIVISION

C. W. PEGRAM

The dairy industry of North Carolina has enjoyed a healthy growth during the past ten years. It is estimated that the farm value of milk and cream amounted to approximately \$20,000,000.00 in 1936 with a total production of 1,332,000,000 pounds or 1,548,837 gallons. In 1936 the total production was valued at \$8,729,000 or a 250 per cent increase during these ten years.

The Dairy Division protects the producer and manufacturer against inaccurate tests by continuous checking of the accuracy of the work of licensed testers, weighers, and samplers, and by inspection of all testing equipment used by dairy plants and stations. This work is very important to the industry and it is estimated that if 0.2 per cent error were made on all tests through careless sampling and testing, this amount would cause approximately a \$50,000.00 loss to the dairymen and cream producers of the State.

The Division was reorganized in January 1937, and a system of test supervision was set up that was comparable to those adopted by the leading dairy states. Definite regulations were established requiring the use of proper equipment and satisfactory results were required of each tester before license was issued. It was found that this method was more satisfactory than routine written examination. Licensed testers were required to make tests at regular intervals and to hold samples for check purposes by members of the Division.

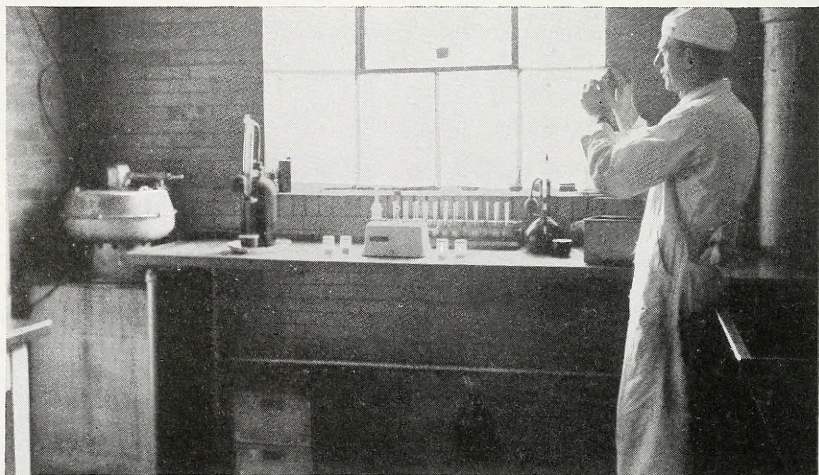
One of the first problems attacked during the reorganization was the problem of securing accurate samples on the cream routes. Some route men were found to be doing careless work by taking samples off the top of the cream. In some cases it was found that certain producers were being shown favoritism. This careless sampling resulted in a shortage of fat delivery at the plants and in order to keep from losing money, test adjustments were made. From data secured, it appeared that changes in tests were adjusted to approximately 5000 pounds monthly or \$1500 expressed in monetary value. This was a bad practice, the worst feature of which was that the honest producer was being penalized. We are glad to report that this practice is a thing of the past. This should encourage the cream producer, and it is found to be more satisfactory to the butter plants.

Much progress has been made with this work during the past biennium. This has resulted in better return to the wholesale

dairymen and cream shippers of the State. For example, ninety per cent of the testers, making tests of composite milk samples, were found to improve their tests approximately .2 to .3 per cent after using water baths of 105°-110° Fah. for preparing sampling. This melted the fat from the sides of the bottles producing more accurate results. The use of hot water baths of 130-140 degrees and glymol probably added increases of one per cent to readings of cream tests.

The plants and stations have coöperated very materially in this work by installing better equipment and facilities. Nearly all plants have well equipped laboratories. Electric centrifuges with heating elements are being used almost universally and their use has also made a distinct contribution toward accuracy and convenience. One of the problems of composite samples, which are used by nearly all plants, is "oiling" off, which tends to produce inaccuracy in making the test. A new process for the preparation of samples has been found by research. This system is being tried out and from all reports it will be a worth while contribution to the Babcock test procedure.

It has been necessary to revoke the license or to debar from further testing five testers and four cream haulers.



THE DAIRY DIVISION PROTECTS THE PRODUCER AND MANUFACTURER AGAINST INACCURATE TESTS BY CONTINUOUS INSPECTION OF THE TESTING EQUIPMENT USED IN STATIONS AND FACTORIES AND BY CHECKING THE ACCURACY OF THE WORK OF LICENSED TESTERS.

STATISTICAL REPORT

Buying plants supervised.....	50
Cream stations supervised.....	30
Plant Investigations.....	1,078
Special investigations.....	25
Testers' licenses issued.....	70
Weighers' and samplers' licenses issued.....	48
Cream haulers' licenses issued.....	115
Check tests made.....	9,361
Tests supervised.....	7,558
Total.....	16,919
Tests found incorrect (changed).....	256
Testers' licenses revoked.....	5
Cream haulers' licenses revoked.....	4
Weights confiscated.....	7
Milk and cream scales checked.....	68
(In cooperation with Bureau of Weights and Measures.)	
Scales condemned for repairs.....	12
Test reports mailed dairymen.....	5,186
Oleomargarine inspections.....	241
Wholesale oleomargarine licenses issued.....	22

Scale Testing: All scales and balances used for weighing milk and cream were periodically checked for accuracy. This work was done in coöperation with the Bureau of Weights and Measures. The results of the first check-up showed 42 per cent to be inaccurate. This was due to lack of sensitivity ratio in a number of cases, meaning that the increase and decrease of the load did not cause the beam or needle to move. Creamery scales are subject to unfavorable operating conditions due to presence of water and steam in the receiving rooms. Licensed weighers are given supervision as to weighing methods and are cautioned in regard to completely dumping all milk from the cans. Several investigations were made for producers making complaint as to inaccurate weighing.

Oleomargarine Law: The Division has part enforcement of the oleomargarine law. A total of \$1700 was collected from wholesaler's license fees in 1937 and \$2200 in 1938, as compared with \$1225 in 1936. The laboratory work and the licensing of retailers is done by the Pure Food Department. A total of 241 inspections were made of cafes and restaurants relative to the posting of oleomargarine placards.

Quality Cream Program: In coöperation with the Dairy Extension Office of State College, a quality cream program was offered to the butter manufacturers of the state. This program was similar to that carried on by other states; however, the plan was not adopted, hence the responsibility of poor quality cream rests on the manufacturers. This problem must be met in the near future, and the Division should be able to render worthwhile assistance in the matter.

North Carolina State Fair: The Division held an exhibit at the state fair relating to the testing of milk and cream, and to the consumption of dairy products.

Results of Work: The results secured from the work during the biennium show that progress has been made and that more accurate weighing, sampling, and testing has been done throughout the state. This accuracy has established confidence between buyer and seller. This condition makes for stable market conditions and is desirable for the further development of the dairy industry within the state.

DIVISION OF STATISTICS

W. H. RHODES

COÖPERATIVE RELATIONS

In 1919, the State Department of Agriculture perfected an agreement with the Bureau of Agricultural Economics of the United States Department of Agriculture establishing the Cooperating Crop Reporting Service. Since that time this service has developed into a well established agricultural information office. Through this agreement, duplications in efforts have been largely eliminated, and the crop estimates work of the two Departments in North Carolina have been combined to give maximum results at a minimum of cost. During all of these years, the relationships between the two Departments have been most harmonious and both agencies have been enabled to secure much detailed information which could not have been done through any other arrangement. The State Department of Agriculture has thus had full access to the information accumulated by the Federal Department, and has been permitted to develop these records on a *county* basis that otherwise would have been impossible.

The Federal contributions annually are approximately as follows:

Direct contributions:		
Personnel	\$10,500	
Supplies and equipment	3,400	
Publications, United States	1,100	
		\$15,000
Postage equivalent (first class)		30,000
WPA		11,000
		<hr/>
		\$56,000
The State contribution		\$22,628

METHOD OF PREPARING REPORTS

The Crop Reporting Service is now maintaining lists of voluntary crop reporters, totaling approximately 15,000. About 172 different regular and special reports are developed annually through the aid of these classified lists. Printed inquiries and schedules are mailed (under frank) to these voluntary aids, returned reports are tabulated, edited, summarized, etc., and through a graphic method of comparison with past performance, the Service is enabled to estimate the acreage, yield, production, price and value of all the crops and livestock that the state produces. In 1937, over one million franked envelopes were utilized in securing these reports. The stationery and envelopes were supplied by the Federal Department, representing a postage equivalent of approximately \$30,000 annually. Special, modern

machinery is required for the folding, sealing, opening and handling of this mail.

REPORTS PREPARED

The following is a list of reports developed annually by the Crop Reporting Service covering all phases of agricultural production. Of the 180 reports developed yearly, each averages well over 200 individual farms or communities.

	1937	1938 (To Aug. 1)
Regular Monthly Crop Report.....	12	7
Mill and Elevator (Grain Stocks).....	6	3
Commercial Poultry.....	12	7
Livestock Reports.....	4	4
Price Reports.....	50	28
Acreage Surveys.....	3	2
Acreage and Production Survey.....	1	
Crop Meter Records (6,800 miles tabulated).....	2	1
Buckwheat.....	3	
Ginners Reports.....	7	
Regular Cotton.....	7	2
Special Cotton.....	2	4
Special Tobacco.....	3	2
Special Turkey.....	1	2
Special Pecan Survey.....	2	
Special Lespedeza Survey.....	1	
Special Peanut Survey.....	1	
Special Soybean and Cowpea Survey.....	1	
Legislative Acts Administered:		
Tobacco Warehouse Sales.....	5	2
Threshers (Small Grain and Peanuts).....	2	
Farm Census Survey:		
Covering itemized acreage records for		
265,466 farms in 1937		
266,168 farms in 1938		
Supplementary Reports.....	24	8
Other Special Reports.....	4	16
Farm Forecaster.....	8	1

MAIL HANDLED

	1936-1937	1937-1938
Outgoing—		
Schedules.....	399,901	231,961
Reports.....	128,817	109,763
Letters.....	13,325	16,292
Farm Forecaster.....	22,000	43,000
Rural Carrier Cards.....	69,800	74,790
Incoming—		(To Sept. 1, 1938)
Letters.....	7,705	4,882
Schedules (Reports).....	59,178	39,135
Papers.....	1,242	535

FIELD TRAVEL

In connection with the development and publication of these reports, it is necessary that frequent and extensive field investigations be made in order that the Statisticians may edit and be

familiar with effects of weather, disease, insect and with general field conditions throughout the state. Approximately 15,000 miles are covered annually in field studies. During this field work, supervisory contacts are made with county agents, agricultural teachers, county officials, A.A.A. Committeemen, and with farmers. The work required through the state laws ad-



BURLEY TOBACCO.

THE STATISTICIAN MAKES A DETAILED FIELD EXAMINATION OF CROP CONDITIONS.

ministered by this Division necessitates field travel supervision. These laws include our annual Farm Census, the tobacco warehouse sales reports, the threshermen's reports on small grains and peanuts, etc. About 6,800 miles are covered annually by our crop meter measurements, as a check on the crop acreage estimates. Monthly field investigations of the cotton crop are made at five mile intervals throughout the cotton belt from July to October. New crop reporters are constantly sought and required, as they are on a voluntary basis.

CLERICAL FORCE

The Federal Department supplies five regular employees including one Agricultural Statistician, one secretary and three clerical assistants. The State Department supplies ten regular employees. The work of the Division is so arranged that the

state employees' duties are the development of the state requirements, and to assist with the federal work when required. The federal employees also assist with the development of state reports so that no sharp division can be drawn in the work of the Service. All work for one purpose—"Agricultural economic information service."

PUBLICATIONS

The Crop Reporting Service releases monthly reports showing the estimates of each of the crops and livestock grown. Special reports are prepared and released on cotton, tobacco, prices, livestock, and certain truck crops, labor, and other economic features. These reports are released in mimeographed form and are available to the press and certain individuals desiring them. In addition, two regular issues annually of the Farm Forecaster are printed and released. These publications contain the complete records by counties of the estimates made by the Service during the year with explanatory comments and illustrations. There has been an increasing demand for more frequent publications which, due to limited funds, the Division has been unable to prepare.



THE STATISTICIAN INSPECTS THE CORN CROP.

Requests for all manner of farm information now come to the Crop Reporting Service, which require considerable time for reply. Printed publications of this kind are more satisfactory in

supplying requested information and eliminate extra work in accumulating data requested for individual cases. The Farm Forecaster carries many basic facts not specifically requested. The needs and demands for additional printed bulletins justify consideration of increased appropriation. Frequent news stories and "fillers" are furnished to the Department's Publications Division. However, the Farm Forecaster should be a printed **monthly** bulletin.

COÖPERATION WITH OTHER DEPARTMENTS AND DIVISIONS

During the past two years, this Division has been repeatedly called upon by the Agricultural Adjustment Administration for assistance in the tabulation of county estimates on which to base their county allotments under the agricultural control programs. Both State and Federal employees have assisted in this work. Estimates by counties covering the period from 1925 through 1938 were prepared for all cattle and for milk cows. County estimates for the acreage, yield and production of wheat and cotton were recently prepared covering the years from 1928 through 1937. Constant revisions of these figures have been made and the data so prepared will be published in a forthcoming issue of the Farm Forecaster. In addition to the above, this Division has increasingly assisted materially in the mimeographing of forms and reports called for by other divisions of the Department of Agriculture. Approximately 100,000 copies of these forms were printed for other divisions, including an average of about 25 stencils per month.

WPA PROJECT

Early in 1938, this Division outlined and applied for a WPA research project for the development and analysis of the historic records that have accumulated, particularly in connection with our Farm Census Survey. This project was approved and is now being conducted with the assistance of 12 regular WPA clerical workers. The work of these individuals is necessarily confined to the development of the "old" records as outlined in the project. This represents about \$22,000 contribution. A trained supervisor holding college degrees in statistical economics is in charge. The space available for the work is most inadequate.

OFFICE WORKING SPACE

Personnel, regular: There are 5 federal and 10 state employees, together with 12 WPA workers, making a total of 27 employees. There are only 6 rooms available for these workers, or an average of 4½ persons per room. This is a situation too

crowded for either comfort or efficiency. With even walking space limited, good desk light is impossible and mental activity greatly handicapped. There is no available space for placing much of our required equipment. The Statistical Division offices are the MOST CROWDED of any in the Department of Agriculture. Considering the large federal contribution and fine coöperation, together with the nature of the work (constant paper work and calculating) such conditions should, by all means, be remedied.

VALUE OF THE CROP REPORTING SERVICE

That the North Carolina Crop Reporting Service has proven a good investment to the farmers of the state is evidenced by the fact that:

- (1) The North Carolina Department of Agriculture is recognized as having the most complete Statistical Division of any Southern state.
- (2) The Service has brought the farmers of the state in more active coöperation with the Department.
- (3) The records accumulated, put North Carolina distinctly in the lead when the administrative farm relief programs were begun in 1933.
- (4) The State Department of Agriculture is recognized as having the official county agricultural facts of this state.
- (5) North Carolina farmers are now credited with being better informed and more statistically minded than any of the neighboring states, as a result of their annual assistance with the surveys collected by this service.
- (6) *The Farm Forecaster* is recognized throughout the nation as being one of the most complete statistical records published by any state.
- (7) The Crop Reporting Service enables the Department to instantly supply information on current crop conditions at any time.

NOTE: Many facts and records are being accumulated by the Service that will prove of inestimable value in studying the record of the state's agricultural progress.

FARM CENSUS SURVEY

In 1918, North Carolina made its first Farm Census, conducted as a Food Administration measure during the World War. While only about 50 per cent complete, this information proved so valuable that legislation was passed making it an annual requirement. Since that time it has grown steadily in completeness and reliability so that for the past three years, this census has been approximately 94 per cent complete. In spite of the complexity of cropping practices in North Carolina, the results obtained have proven the equal of any state.

Since January 1, 1937, the high standard of personnel required for the handling of this work has aided greatly in facilitating its present status and its speedier publication.

The fact that North Carolina is the only southern state collecting an annual Farm Census placed this state in an available position in establishing the farm quotas under the Agricultural Adjustment Administration and, also, enables the State Department of Agriculture to coöperate more efficiently with other departmental agencies as well as enabling the Department to supply to county agents, agricultural teachers and others, county basic data for planning their programs.

CREDIT UNION DIVISION

C. C. BOOKER

During the past biennium (1936-1938) credit union development in the state has been greater than during any similar period since the enactment of the Credit Union Law in 1915.

On July 1, 1937 funds were made available for the employment of an auditor and a secretary; thereby permitting the superintendent to devote much more time to organization work. Consequently most of the growth for the period covered by this report has been during the second year of the biennium.

Thirty-two credit unions were organized in the period under review, twenty-two of this number in the second year. Each of these new credit unions has shown steady progress.

Emphasis has been placed on the organization of agricultural credit unions and although it is a recognized fact that the organization of agricultural credit unions is a much slower process than is the case in occupational and industrial groups, eight agricultural credit unions have been organized during the biennium—seven of these during the past twelve months.

As a result of the educational program carried on by this division during the past year, a much greater number of this type of credit union should be organized in the future.

We are already seeing the effect of the ground work which has been laid. Two agricultural credit unions were chartered in July and a number of others are in the process of organization. In addition to the credit unions classified as agricultural, a number of community credit unions are serving people in rural areas.

While most of our time and effort has been devoted to the organization of new credit unions, we realize that the organization of credit unions is just the beginning of our responsibility. Considerable effort has therefore been put forth to intensify the service of existing credit unions and to put them to the fullest use possible.

Meetings have been frequently held with credit union leaders and groups throughout the state, resulting in a better understanding of good credit union practices. These meetings have also had the effect of broadening the scope of activity of numerous credit unions to the end that service to the membership is increasing tremendously.

Within the last twelve months, all credit unions have been examined at least once and in many cases the examination has taken the form of a detailed audit. In a few cases irregularities

have been found and corrected and all credit unions are now operating on a sound fiscal basis.

Of the seventy-two charters in force on June 30, 1936, only forty-eight represented actively operating credit unions. The remaining twenty-four charters were granted over a period of several years and these credit unions had very limited operations, or did not operate at all. In the case of these inactive credit unions, steps have been taken with the view to effecting liquidation as required by law. An examination of the record reveals that very little money is involved and we anticipate no losses to the members.

The following table was compiled from reports filed by all actively operating credit unions at June 30, 1938.

		Percentage of Increase Over Previous Year
Number Active Credit Unions.....	78	39%
Members.....	12,343	44.6%
Assets.....	\$ 921,548.99	25.6%
Shares.....	\$ 585,900.87	27.2%
Deposits.....	\$ 216,464.43	9.1%
Loans Outstanding { Number.....	7,471	45.2%
{ Amount.....	\$ 781,533.72	23.18%
Loans Made Since { Number.....	51,281	25.33%
Organization { Amount.....	\$5,863,366.66	35.6%
Reserve.....	\$ 48,946.11	31%
Surplus.....	\$ 46,615.94	27%

The above figures reveal that these 78 Credit Unions control almost a million dollars. It means that over twelve thousand citizens have pooled their savings and have almost a million dollars worth of credit.

Most savings in Credit Unions would not otherwise have gone into a savings account but because of the convenience, safety, and the fact that members are encouraged to save the smallest amounts systematically, thousands of members have substantial savings in their Credit Union. The members have also saved many thousand dollars in interest charges on loans through their Credit Union compared to the cost of personal loans from other sources.

The Department of Agriculture, by providing the machinery for Credit Union operation, is helping the farmers and wage earners of the state to find their way to economic betterment, which is increasing the purchasing power of its citizens.

STATE MUSEUM

HARRY T. DAVIS

Objectives: In the first place it might be stated that the Museum is a repository and exhibition of the Natural History and Natural Resources of North Carolina. Our objective is to make this the best collection possible and to make of this the best exhibits possible.

Our purpose is to inform and educate visitors from far and near as to our resources and plant and animal life. This likewise is a substantial aid in teaching students of our colleges and schools. Our visitors include youth and adults, the unlettered and the learned. Our exhibits must be organized and labelled to convey knowledge to all.

Exhibits: Since the first State Geologist began collecting mineral specimens for the Board of Agriculture in 1823, there has been cumulatively built a State Museum, the inventory of which would run into many thousand dollars, and some exhibits which could never be duplicated. The responsibility for caring for these exhibits and protecting them from hazards such as fire is a reality.

Much of our exhibit material represented North Carolina at many large expositions. Many items represent gifts from interested citizens, and some items have been purchased or collected by the Museum staff. We have a fortunate situation in which the more active the Museum progress, the more our citizens contribute to build a better Museum.

Trying to divine the future for this Museum we realize that the wide range of plant and animal life, and the varied minerals and geological formations have been barely touched insofar as they can be used to make attractive educational exhibits. The Museum must grow if it is to maintain the public esteem which it has.

During the period under consideration, new exhibits have been prepared and placed in all of our nine large Halls. Our policy has been to have the nine divisions (9 Halls) of the Museum develop simultaneously and this means substantial progress which is greater than is apparent. Notable additions are the habitat Harbor Seal group and observation bee hive in Hall IX; the 13½-foot Basking Shark, the 800-pound Ocean Sun Fish, and the Gulf Stream Game Fish in Hall VI; two large prehistoric Indian Pots in Hall V; and the Terraria for live poisonous snakes of North Carolina in Hall I. The latter, with aquaria under construction,

are unique and attractive exhibits which bring us much favorable comment.

Also in Hall I is a pair of the long-extinct Passenger Pigeons. This is a prize exhibit which we have long sought. Finally Mr. Brimley arranged to exchange skins and skulls of the extinct Carolina Beaver to the Museum of Comparative Anatomy, Harvard University, for a pair of mounted birds valued at \$1,000.00.

Our Museum to keep pace with modern practice must replace cases of forty years ago with modern types and provide proper lighting. Our office help is enabling us to remedy most of our labelling problems. Inasmuch as we have to adapt our exhibits to an Old building—with no modern Museum building in immediate prospect—I made request to your Executive Committee for funds for systematic replacement of cases and improvement of lighting.

Attendance: Although we do not make counts of all visitors to the Museum, we do make sample counts, from which we can obtain reasonably accurate estimates of Museum visitors. Some of our high counts are 475 to 500 in one hour during conventions and State Fair week. We feel safe in saying that we have more than 200,000 visitors each year.

Given the exhibits it is logical that the Museum should be available for maximum use. Of our own accord the Halls are kept open from 8:30 A. M. to 5 P. M. every day of the year except Sundays and Christmas Day. It is our opinion that we should follow modern museum practice and be authorized to open the Halls on Sunday afternoons, with provision being made for the services of necessary attendants.

With our personnel, we cannot provide general guide service for the many visitors we have, but the Raleigh Junior League has provided this for us with many organized school classes. We hope to provide this more adequately for all visitors by working with N. Y. A. or W. P. A.

Modern elementary education makes use of travelling exhibits. It is logical that the State Museum plan and provide such exhibits. With the exception of the donation of some 175 prepared mineral specimens, this is needed work which is requested, but beyond our present means.

Accessions: This is given in summary and indicates the large number of specimens we have handled. Details are shown in our records. For obvious reasons only a fraction of these become actual Museum exhibits.

During the past biennium we have handled in one way or another the following accessions:

Invertebrates.....	144
Plants.....	42
Indian artifacts.....	284
Fishes.....	48
Pictures.....	1,184
Agriculture.....	91
Birds.....	149
Reptiles—Amphibians.....	2,262
Mammals.....	89
Geology.....	389

Of the Archeological specimens many have been passed on to the University study collections. Pictures include a thousand prints of "Birds of the N. C. Sandhills". With the Reptiles and Amphibians there are about 800 from our Entomology Division and approximately 1100 specimens from the personal collection of C. S. Brimley. Our most unusual specimen is rare deep sea fish (*Alepisaurus ferox*) which came from Bodie's Island.

Of general nature were: a camp trailer being used in Archeological field work; a new marble floor and drinking fountain in our Entrance Hall; and a historical Farm Home collection from the W. M. Sanders estate.

Publications: Thru the years the Museum has had publicity thru the active and sympathetic interest of the newspapers. This has aided us immeasurably. During June of this year we got out the first printed publication of the Museum. This is a modest leaflet giving in outline the scope of our exhibits and work. This has already proven its worth. Previous efforts have been restricted to mimeographed sheets and even these have been in demand by our citizens. We have now the copy for and expect to publish our first Bulletin during this year.

Library: Over a very long period of years we have built a creditable Natural History Library by means of a few purchases, and by many gifts from other Museums. I have made a request to the Executive Committee of the Board for the future development of this Library. Effective secretarial help has made good progress in classifying, marking, and cataloguing our hundreds of publications.

Personnel: The Museum now has a working staff which has enthusiasm and earnestness in the goal of a more useful institution. This fortunate condition makes up to some extent for our comparatively small number. H. H. Brimley, as Curator of Zoology, has the value of extended and varied experience to couple with his consistent good work. He mounted some of the marine fishes now on exhibit during the summer of 1884. We might well pause to pay tribute to a fine citizen of his community who has been a leader in his vocation over a period of 54 years.

Mrs. Simpson is a skilled and hard-working taxidermist and assistant to Mr. Brimley. We very much need her full-time services for the Museum work, and we will ask that this change be arranged as soon as our North Carolina sportsmen can find competent taxidermists to give them the service they desire. In Mrs. Green as general secretary we have our first efficient system of cataloguing, labelling, and information service to the public. This allows technical work to proceed as it should.

Having now an active handy-man and janitor and a maid we can keep our Halls clean and attractive in spite of a very old building and cases which are not all modern. Having the only public rest rooms on Capitol Hill, the public is appreciative of these services.

This subject of personnel is recorded because it is anticipated that we shall continue to have the interest and consideration of the authorities fixing compensation for comparative services rendered.

Coöperative Work: Taking an active interest in the recently formed N. C. Archeological Society resulted in the Museum Director being named President of the Society. This Society has already done much to remedy the State's neglect of the study and preservation of the remains left by its American Indians. Already excavations have revealed facts of interest to archeologists everywhere. The only Indian Mound in Central North Carolina is now set aside to be restored as a State Park near Mount Gilead, the gift of L. D. Frutchey. With a modest appropriation, the Museum thus secures aid from relief agencies (W. P. A. and N. Y. A.), and coöperation from the Society, the Department of Conservation and the State University, and does a piece of work of value for all time. The Museum benefits from material found to be suitable for exhibits. Now in process is a comprehensive W. P. A. state-wide archeological project.

The Museum staff took an active part in the organization of a N. C. Bird Club and the Raleigh Bird Club and consequent mutual benefits to ornithologists and the Museum.

With the coöperation of the State Art Society, we have taken care of their exhibits in Hall V. Some effort has been expended in making this useful to the public until such time as the Society has more suitable public space. It is planned to eventually devote all this Hall to Archeology.

To the Museum staff has been assigned the execution of the exhibit of the Department of Agriculture at the State Fair. This has had effort applied, but not always with satisfactory results. The problem continues to receive our best efforts.

General: Inquiries on subjects that range from "renting blood-sucking leaches" to the "age of the Earth" continue to come to the Museum by 'phone, mail and by visitors. We deem it our duty to patiently and fully explain.

Between two and three hundred mineral specimens come in from North Carolinians every year. These are analyzed, identified and evaluated. No complete assays are furnished, and where these seem justified the owner is referred to a commercial assayer, with a word of caution as to the taking of samples. The Museum laboratory has its main use in analysis of specimens for the Museum exhibits.

With the advent of the new State Building on Salisbury Street, our old building is conspicuous by contrast. While it may not be advisable to renovate this exterior, our Salisbury Street entrance should be remodelled. The reason—we are pleased to report—is that the Hall of History (Historical Museum) will have more adequate quarters and new equipment on the first floor of this new building. For public convenience—especially to eliminate traffic hazards for school children—this is important.

WEIGHTS AND MEASURES

C. D. BAUCOM

I am pleased to report that the people of North Carolina are becoming more and more Weights and Measures minded as evidenced by the constantly increasing requests for inspection of weighing and measuring devices. Our limited personnel has made it rather difficult, and sometimes impossible, to comply with all the requests as quickly as desired; nevertheless, we have acknowledged and taken care of the demands as quickly thereafter as was consistent with an economic disbursement of traveling expenses.

Results of activities of this Division during the last biennium are very gratifying considering that less than \$15,000 per annum was appropriated for this work. Our records in condensed form are as follows:

	Weights, Measures and Devices		Packages		Total
Approved.....	72,097		34,844		106,941
Condemned.....	5,162		7,599		12,761
Confiscated.....	3,406		0		3,406
Released.....	1,332		0		1,332
Total.....	81,997		42,443		124,440
Number places visited.....	1936-37	3,330	1937-38	8,098	11,398

In addition to these inspections, it is to be borne in mind that the testing and sealing of weighing and measuring apparatus is just half of our work; the other half being the observation of the use of such equipment and the apprehension of those who would use approved equipment for fraudulent purposes. This situation is the most difficult of all our problems, and in coping with it we can make no tangible record of such activity.

With the recently purchased equipment, the Division is now in position to calibrate or test liquid capacity measures from one cubic centimeter to one thousand gallons; dry measure, from one-half pint to one bushel; weight, from one-tenth of a grain to ten tons; and linear measure, from one thirty-second of an inch to one hundred feet. Our new electrical and gas testing equipment enables us to check line voltage and to test watt-hour meters and gas meters. In this connection, I am happy to report that operating in conjunction with the Utilities Commission, we have received splendid coöperation in handling relevant complaints.

For the first time in the history of North Carolina surveyors' chains and large meters, as well as large capacity gasoline meters can now be accurately tested and sealed. With the use of our heavy-duty scale testing outfit, we can now for the first time certify to the owners of large platform scales just how accurate their scales are and assist them in getting them properly adjusted when adjustment is needed. We are especially proud of this last-mentioned piece of equipment and happy to render the service which it affords, a service which has been in constant demand ever since the creation of the Weights and Measures Division. An additional unit of this kind is greatly needed ere we spend two years in covering the State.

The splendid coöperation received from the Food Inspection Division, Dairy Division, Fertilizer Inspection Division, and Warehouse Division has aided greatly in accomplishing the results obtained during this biennium, and, in fact, the feeling of camaraderie of all the Division heads which has developed during this period has been a wonderful influence in carrying on.

STATE FAIR

DR. J. S. DORTON

Operation of the State Fair was taken over by the State Department of Agriculture in 1937 after it had been leased by private individuals for a number of years.

A profit of \$8,048.43 was returned to the taxpayers by the 1937 exposition for the first time under state management. Including permanent improvements, reconstruction of an industrial building, rewiring of the electrical distribution system and the construction of a new walkway leading to the grandstand, the profit would be increased by approximately \$7,500.00, bringing the total profit to \$15,548.43.

It has been the purpose of the State Fair management to present the fair as a State Institution and to operate it not with the view of obtaining profits, but with the purpose of returning to the citizens penny-for-penny in benefits as reflected by exhibits on agriculture, industry and education.

The fact that the total number of individual exhibits was approximately doubled in 1937 is an indication that the people approve of State operation of their fair.

Agricultural, industrial and educational exhibits have been paramounted under operation by the Department. Of course, the management anticipates that expenses can be met following each exposition, but beyond expenses the fair should not be expected to yield a profit any more so than any other state institution.

As the biennial report of the Department is completed, state auditors have not finished their report on the 1938 exposition. However, it can be definitely stated that both the 1937 and 1938 expositions were educationally and financially successful.

DIVISION OF ACCOUNTS

A. R. POWLEDGE

The Division of Accounts was formed by the Commissioner of Agriculture to simplify the record-keeping, disbursements, purchasing, and the issuance of tax tags, heretofore scattered throughout the Department.

Adoption of modern and approved accounting methods and a central system for handling purchases for the various divisions have effected substantial savings and eliminated overlapping of work.

Establishment of the present system of accounts has met the approval of the Budget Bureau and State Auditor's Office.

Under the new purchasing system, requisitions for purchases are first submitted to the Central Office where it is determined whether funds are available and it is expedient to make the purchases. The Division of Purchase and Contract makes all purchases.

All tax tags for fertilizer, feed, agricultural lime, seed, and insecticides, as well as seed licenses and others, are issued by the Division of Accounts. A perpetual inventory is kept in this connection.

The financial statement of the Department follows:

FINANCIAL STATEMENT STATEMENT OF DISBURSEMENTS

July 1, 1936 - June 30, 1938

<i>Administration</i>	<i>1937-38</i>	<i>1936-37</i>
Board.....	\$ 1,602.25	\$ 2,585.55
Salary Commissioner.....	5,000.00	4,625.01
Salaries Staff.....	19,915.60	14,256.26
Supplies.....	1,020.16	1,014.96
Tags.....	7,856.34	8,220.90
Postage.....	1,099.96	799.50
Telephone and Telegraph.....	471.61	415.16
Express, Freight, Etc.....	74.92	62.69
Travel.....	1,800.89	1,599.73
Printing Forms.....	492.54	404.53
Printing Bulletins.....	4,193.70	3,432.02
Repairs.....	49.68	57.81
General Expense.....	98.32	160.35
Equipment.....	1,448.02	1,148.12
Repairs to Buildings.....		152.00
Total.....	\$ 45,123.99	\$ 38,934.59

Inspection

	1937-38	1936-37
Salaries and Wages.....	\$ 5,027.00	\$ 11,709.55
Salaries and Wages—Extra.....	2,753.62	-----
Supplies.....	138.41	-----
Postage.....	100.00	-----
Freight and Express.....	225.25	407.40
Field Travel.....	19,363.64	17,323.26
Printing.....	94.77	-----
Total.....	\$ 27,702.69	\$ 29,440.21

Markets

Salary Chief.....	\$ 3,600.00	\$ 3,126.00
Salaries Staff.....	14,260.68	5,386.00
Salaries—Extra.....	304.83	208.00
Supplies.....	367.31	218.63
Postage.....	152.26	130.00
Telephone and Telegraph.....	243.31	67.29
Express.....	4.17	-----
Field Travel.....	4,584.25	2,133.13
Printing.....	-----	29.03
Repairs.....	13.80	-----
Per Diem and Fees.....	732.34	832.25
Subscriptions and Dues.....	128.50	113.50
Equipment.....	539.33	160.83
Total.....	\$ 24,930.78	\$ 12,404.66

***Credit Union*

Salary Chief.....	\$ 2,950.00	\$ 2,190.00
Salaries Staff.....	2,469.38	-----
Office Supplies.....	60.56	-----
Postage, Telephone and Telegraph.....	83.05	-----
Field Travel.....	2,374.46	908.47
Printing.....	9.25	-----
Office Equipment.....	1.87	-----
Printing Forms for Resale.....	219.62	618.73
Total.....	\$ 8,168.19	\$ 3,717.20

Entomology

Salary Chief.....	\$ 3,438.00	\$ 3,131.88
Salaries Staff.....	10,685.99	8,415.60
Office Supplies.....	67.15	83.18
Scientific Supplies.....	3.18	103.24
Postage.....	139.17	245.00
Telephone and Telegraph.....	99.83	122.30
Freight and Express.....	8.17	7.76
Field Travel.....	4,799.25	4,027.30
Printing.....	51.70	165.76
Subscriptions.....	149.42	47.00
Equipment.....	103.24	218.07
Total.....	\$ 19,545.10	\$ 16,567.09

Seed Laboratory

	1937-38	1936-37
Salary Chief.....	\$ 3,300.00	\$ 3,065.77
Salaries Staff.....	11,935.63	7,369.50
Office Supplies.....	113.66	69.22
Scientific Supplies.....	92.12	30.27
Postage.....	209.08	200.00
Telephone and Telegraph.....	64.13	64.23
Express, Freight, Etc.....		
Field Travel.....	226.80	1,024.94
Printing.....	254.35	198.92
Repairs.....	12.50	16.50
Office Equipment.....	47.25	201.05
Scientific Equipment.....	668.20	2,330.57
Total.....	\$ 16,923.72	\$ 14,570.97

Analytical

Salary Chief.....	\$ 3,438.00	\$ 3,126.00
Salaries Staff.....	40,789.58	32,790.62
Office Supplies.....	361.53	190.27
Scientific Supplies.....	2,778.77	2,158.94
Postage.....	425.00	415.00
Telephone and Telegraph.....	134.86	131.90
Express and Freight.....	153.83	58.87
Travel.....	539.76	153.60
Printing.....	601.60	752.55
Repairs.....	217.42	190.15
Laundry.....	5.13	6.97
Office Equipment.....	138.96	2,198.87
Scientific Equipment.....	5,312.00	2,033.70
Installing Electric Power Service.....	802.00	
Total.....	\$ 55,698.44	\$ 44,207.44

Crop Statistics

Salary Chief.....	\$ 2,600.00	\$ 1,998.00
Salaries Staff.....	12,456.00	9,136.98
Salaries Extra—Census.....	2,991.53	3,020.06
Office Supplies.....	143.88	122.86
Postage.....	26.04	48.86
Telephone and Telegraph.....	71.10	88.34
Field Travel.....	839.31	750.57
Printing Publications.....	2,032.14	788.53
Repairs.....	23.48	44.58
Subscriptions.....	10.00	10.00
Equipment.....	1,435.15	62.62
Total.....	\$ 22,628.63	\$ 16,071.40

Museum

Salary Chief.....	\$ 3,438.00	\$ 3,126.00
Salaries Staff.....	5,186.08	3,406.69
Salaries Extra.....	298.12	192.60
Office Supplies.....	297.06	207.68
Postage.....	36.57	30.00
Telephone and Telegraph.....	63.55	60.90
Express.....	10.02	16.35
Field Travel.....	249.55	145.48
Printing.....	97.05	73.69
Subscriptions.....	30.75	32.35
Equipment.....	593.24	354.21
Total.....	\$ 10,299.99	\$ 7,645.95

<i>Serum</i>	1937-38	1936-37
Supplies.....	\$ 499.96	\$ 495.96
Postage.....	298.74	798.23
General Expense.....	25.25	
Serum to be Resold.....	9,374.83	13,789.81
Total.....	\$ 10,198.78	\$ 15,084.00

<i>Veterinary</i>		
Salary Chief.....	\$ 3,600.00	\$ 3,126.00
Salaries Staff.....	12,215.50	12,763.41
Salaries—Extra.....	5,107.62	
Office Supplies.....	339.93	915.70
Postage.....	50.00	52.00
Telephone and Telegraph.....	99.49	131.21
Express.....	19.93	44.54
Field Travel.....	11,278.11	9,442.28
Printing.....	163.68	35.00
Repairs.....		
General Expense.....	49.76	31.32
Equipment.....	43.49	129.42
Total.....	\$ 32,967.51	\$ 26,670.88

<i>Test Farms</i>		
Salary Chief.....	\$ 3,590.00	\$ 3,126.00
Salaries Staff.....	55,152.78	47,358.07
Supplies and Materials.....	21,471.46	12,265.41
Postage, Telephone and Telegraph.....	1,887.24	1,480.98
Travel Expense.....	3,421.39	3,310.07
Light, Water, Power.....	5,240.03	3,479.66
Printing and Binding.....	288.88	139.40
Equipment.....	5,898.03	2,234.52
Additions and Betterments.....	33,982.56	16,719.83
Extraordinary.....	2,541.10	2,062.68
Total.....	\$133,473.47	\$ 92,176.62

<i>Miscellaneous</i>		
Custodial.....	6,480.00	6,480.00
Farmers Conventions.....	300.00	300.00
State Fair Exhibits.....	300.00	361.74
Equipment.....	1,750.00	
Total.....	\$ 8,830.00	\$ 7,141.74

<i>Reserve</i>		
Reserve.....	\$	\$
Excavation Indian Mound.....	347.95	297.14
Payment Salaries, 1933.....		11,465.45
Total.....	\$ 347.95	\$ 11,762.59

<i>Dairy</i>		
Salary Chief.....	\$ 3,438.00	\$ 3,079.77
Travel Expense.....	1,421.95	1,257.44
Supplies.....	32.08	65.78
Postage, Telephone and Telegraph.....	75.71	
Printing.....	51.04	
Equipment.....	13.72	
Total.....	\$ 5,032.50	\$ 4,402.99

<i>Rabies</i>	1937-38	1936-37
Rabies.....	\$ 1,061.78	\$ 1,411.71
<i>Japanese Beetle Work</i>		
Japanese Beetle Work.....	\$ 1,350.00	\$ 1,486.80
<i>Blister Rust Control</i>		
Salaries and Wages.....	\$ 3,912.41	\$.....
Travel Expense.....	515.65	.....
Telephone and Telegraph.....		.....
Supplies and Materials.....	151.57	.....
Motor Vehicle Operation.....		.....
Repairs.....		.....
General Expense.....	86.05	.....
Total.....	\$ 4,665.68	
Total.....	\$428,949.20	\$343,696.84
Paid to State College.....	\$ 26,350.00	\$ 26,350.00
Seed Improvement Work.....	\$ 4,550.00	\$ 4,550.00

** (Reimbursement from General Fund for One-half the expenses of the Credit Union Division, less printing for resale \$3,974.28).

STATEMENT OF RECEIPTS

JULY 1, 1936—JUNE 30, 1938

	1937-38	1936-37
Fertilizer.....	\$223,542.62	\$243,411.50
Cotton Seed Meal.....	27,656.47	19,789.07
Feed Tags.....	58,389.59	55,833.02
Seed Licenses.....	24,950.00	4,050.00
Condimental Feed.....	1,410.00	515.80
Serum.....	9,804.58	15,999.96
Costs.....	1,067.76	518.75
Legumes.....	86.18	80.83
Linseed Oil.....	2,308.66	2,371.74
Bleached Flour.....	14,517.50	13,830.00
Bottling Plants.....	2,402.50	2,420.00
Ice Cream.....	2,280.00	2,255.00
Soybean Inspection.....		
Insecticides.....	639.31	483.89
Analyzing Stomachs.....		
Test Farms.....	41,017.14	30,835.96
Bakeries.....	1,350.00	1,515.00
Chicken Tests.....	9,480.72	9,206.19
Credit Union Supplies.....	580.74	391.00
Seed Tags.....	3,997.18	1,501.35
Seed Tests.....	3.50	
Inspection Entomology.....	1,673.80	1,562.40
Tobacco Grading.....		
Oleomargarine.....	2,402.40	1,600.00
Land Plaster Tags.....	1,992.65	996.40
Rabies.....	2,080.74	4,863.10
Agricultural Lime.....	3,605.86	222.50
Branding Cattle.....	3.00	
Refunds.....		57.37
Dynamometer.....	123.00	
Fertilizer Registration.....	15,893.00	
State Fair.....		338.54
Miscellaneous.....	7.75	
Total.....	\$453,266.65	\$414,649.37
Balance July 1, 1937.....		\$318,865.92
Balance July 1, 1938.....		\$312,302.37

STATE WAREHOUSE SYSTEM
FINANCIAL STATEMENT
STATEMENT OF DISBURSEMENTS

JULY 1, 1936—JUNE 30, 1938

	1937-38	1936-37
Salary Superintendent.....	\$ 3,600.00	\$ 3,126.00
Salaries Staff.....	11,102.16	10,808.25
Salaries (N. C. Cooperatives).....	4,384.66	-----
Office Supplies.....	41.44	159.28
Postage.....	325.00	360.00
Telephone and Telegraph.....	215.82	153.35
Express.....	533.55	368.33
Field Travel.....	2,292.39	1,088.42
*Printing Receipts and Tags.....	7,708.82	5,460.92
Equipment Repairs.....	3.75	-----
General Expense.....	226.59	375.03
Office Equipment.....	-----	195.22
Fire Insurance.....	40.00	39.38
Bonding Employees.....	665.00	665.00
Equipment.....	3,318.70	-----
Payment Salaries, April, May and June 1933.....	-----	716.25
Total.....	\$ 34,457.88	\$ 23,515.43

*Printing Receipts and Tags for Resale.

STATE WAREHOUSE SYSTEM
STATEMENT OF RECEIPTS

JULY 1, 1936—JUNE 30, 1938

	1937-38	1936-37
Interest on Bonds.....	\$ 16,160.00	\$ 16,592.50
Interest on Loans.....	9,480.45	19,687.25
Leases.....	342.00	288.00
*Warehouse Supplies.....	6,276.72	5,901.51
Sale Loose Cotton.....	417.77	213.48
Cotton Classing.....	-----	-----
Miscellaneous.....	-----	62.44
Total.....	\$ 32,676.94	\$ 42,745.18

*Resale of Receipts and Tags.

Treasurer's Cash, June 30, 1938, Supervision Account.....	\$ 50,117.33
Treasurer's Cash, June 30, 1938, Principal Fund.....	25,141.77

WEIGHTS AND MEASURES

	1937-38	1936-37
Salaries and Wages.....	\$ 6,102.50	\$ 4,952.25
Supplies and Materials.....	99.59	400.22
Postage, Telephone, Telegraph and Express.....	338.90	26.08
Travel.....	3,576.88	3,603.32
Printing.....	12.00	58.14
Equipment.....	4.33	-----
Office and Standard Testing Apparatus.....	1,225.65	-----
Total.....	\$ 11,359.85	\$ 9,040.01



UNIVERSITY OF N.C. AT CHAPEL HILL



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